

Ultra Practice Bundle PDF for Railway NTPC Exams - Mathematics

Mathematics

S. No	Topic	Page Number
1	Algebra	01
2	Number System	16
3	Ratio and Proportion	31
4	Time and Distance	49
5	Time and Work	66
6	Trigonometry	84
7	Geometry	100
8	Simple and Compound Interest	118
9	Discount	136
10	Number Series	149
11	Data Interpretation	160
12	LCM and HCF	181
13	Elementary Statistics	193
14	Mensuration	206
15	Profit and Loss	221
16	Mixture and Alligation	235
17	Decimals & Fractions	253
18	Problems on Ages	264
19	Problems on Trains	280
20	Percentage	299

Algebra

1) Find the sum of $m + n$ if $x + 2$ is factor of $x^3 + mx^2 + nx + 6$ and $mx + 6$ | a) -5
b) 5

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c) -8

d) 8

2) Find the factor of the polynomial: $x^3 - 13x^2 + 24x - 12$.

a) $x^2 - 12x + 12$

b) $x^2 - 14x + 48$

c) $x^2 - 12x + 36$

d) None of the above

3) If $16p^2 + 4q^2 + 9r^2 - 16pq + 12qr - 24pr = 0$ and $p = -1$ then find the value of $2q + 3r$

a) 3

b) -3

c) -4

d) 4

4) If $4x^2 + 16y^2 + 12x + 24y + 18 = 0$ then find the value of $x^3 - y^4$

a) $-945/256$

b) $945/256$

c) $-455/236$

d) $455/236$

5) If $8a^3 + 125b^3 + 60a^2b + 150ab^2 = 0$ then find the value of a/b

a) $5/2$

b) $2/5$

c) $-5/2$

d) $-2/5$

6) If $x^2 + y^2 + z^2 = xy + yz + zx$ & $x/y = z$, then find the value of $x^3 + y^3 + z^3$

a) $3x^2$

b) $-2y^2$

c) 0

d) 1

7) The sum and product of two numbers is 54 and 713 . Find the difference between those two numbers.

a) 8

b) 6

c) 7

d) 9

8) If $x + y + z = 21$ then the maximum value of $(x - 6)(y + 7)(z - 4)$ is

a) 343

b) 216

c) 125

d) Can't be determined

9) If $x^2 + 1/x^2 = 7$ then find the value of $x^3 + 1/x^3$ ($x > 0$)

a) 15

b) 14

c) 18

d) 16

10) If $x - \sqrt{x} = 132$ then find the value of x

a) 144

b) 196

c) 169

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d) 121

11) Find the value of $(5.29 + 3.24 + 8.28)/(5.29 - 3.24)$

a) 6.8

b) 7.8

c) 7.6

d) 8.2

12) If $a = 208$, $b = 312$ and $c = 405$ then find the value of $a^3 + b^3 + c^3 - 3abc/(a^2 + b^2 + c^2 - ab - bc - ca)$

a) 725

b) 1

c) 625

d) 925

13) If $(y - x)/(y + x) = 2$, then find the value of y in terms of x

a) $-2x$

b) $2x$

c) $-3x$

d) None of the above

14) If $x = 9 - 4\sqrt{5}$ then find the value of $\sqrt{x+1}/\sqrt{x}$

a) 1

b) $2\sqrt{5}$

c) $3\sqrt{5}$

d) $4\sqrt{5}$

15) If $p + q + 2 = 0$ then find the value of $p^3 + q^3 + 8 - 6pq$

a) 24

b) 36

c) 0

d) 42

16) If $xy = 0$ and $x/y = 1/2$, then find the value of $(x^3 + y^3)/(x^2 + y^2)$

a) 0

b) $3x$

c) 1

d) $3y$

17) If $x + 4/x = 4$, then find the value of $x^5 + 1/x^3$

a) $257/8$

b) $235/8$

c) $247/7$

d) $247/6$

18) If the roots of the quadratic equation $3x^2 - 6x + p = 0$ are real and equal then find the value of p .

a) 4

b) 3

c) 2

d) 8

19) If $(a + b - c)^2 = 16(a - c) + (b + c - a)^2$ then find the value of b

a) 8

b) 16

c) 12

d) 4

20) Find the quadratic equation whose roots are $1/p$ and $1/q$

a) $pqx^2 - (p + q)x + 1 = 0$

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b) $x^2 - (p + q)x + 1/pq = 0$

C) $pqx^2 - (p + q)x + 1/pq = 0$

d) None of the above

21) Find the sum of the factors of the equation $2x^2 - 7x + 3 = 0$

a) 7

b) -7

c) $3x - 4$

d) $2x - 6$

22) If A and B are positive roots of quadratic equation and $(A + B)^2 = 729$ and $(A - B)^2 = 225$, then find the quadratic equation whose roots are A and B

a) $x^2 - 27x + 126$

b) $x^2 - 24x + 144$

c) $x^2 - 28x + 192$

d) None of the above

23) If $x + 1/x = \sqrt{3}$, then find the value of $x^6 + 1/x^{12}$

a) 2

b) -2

c) 0

d) $\sqrt{3}$

24) If $a + b + c + d = 2$ then find the maximum value of $(ab + bc + cd + da)$

a) 12

b) 1

c) -1

d) 14

25) If $x + (1/(x + 1)) = 1$, then find the value of $(x+1)^3 + 1/(x+1)^7$

a) $57/13$

b) $54/15$

c) 2

d) 0

26) If $p + (1/p) + 2 = 0$ then find the value of $(p + 2)^2 + 1/(p + 2)^4$

a) 12

b) -12

c) 2

d) -2

27) If $x - 1/x = 7$ then find the value of $x^2 + 1/x^2$

a) 51

b) 47

c) 0

d) 2

28) If $7p + 1/6p = \sqrt{5}$ then find the value of $49p^2 + (1/36p^2) + 1$

a) $11/3$

b) 5

c) $13/3$

d) 0

29) If $x + 1/4x = 6$ then find the value of $16x^2 + 1/x^2$

a) 124

b) 576

c) 568

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d) 128

30) Solve: $2^{16} - 255(2^8 + 1)$

a) 1

b) -12234

c) -2346s

d) None of the above

31) Solve: $[(a - b)/(a + b)] - [(a + b)/(a - b)]$

a) $4ab/(a^2 - b^2)$

b) 0

c) $-4ab/(a^2 - b^2)$

d) $2(a^2 + b^2)/(a^2 - b^2)$

32) Solve: $[(\sqrt{6} + 1)/(\sqrt{6} - 1)] + [(\sqrt{6} - 1)/(\sqrt{6} + 1)]$

a) -12/5

b) 12/5

c) -14/5

d) 14/5

33) If $x = (1 + \sqrt{2})/(1 - \sqrt{2})$ **and** $y = (1 - \sqrt{2})/(1 + \sqrt{2})$ **then find the value of** $x/y - y/x$

a) $-24\sqrt{2}$

b) $24\sqrt{2}$

c) $12\sqrt{2}$

d) $-12\sqrt{2}$

34) If $a + b = 4$ **and** $ab = 1$ **then find the value of** $(a^2 + ab + b^2)/(a^2 - ab + b^2)$

a) -7/6

b) 7/6

c) -15/13

d) 15/13

35) If $a^3 - b^3 = 26$ **and** $(a + b)^2 = 13 + ab$ **, then find the value of** $(a - b)$

a) 1

b) 2

c) -2

d) 0

36) If $p = \sqrt{5} + (1/\sqrt{5})$ **and** $q = \sqrt{5} - (1/\sqrt{5})$ **then find the value of** $p^3 + q^3$

a) $47/\sqrt{5}$

b) $46/\sqrt{5}$

c) $57/\sqrt{5}$

d) $56/\sqrt{5}$

37) If $a + b = -c$ **, then find the value of** $a^3 + b^3 + c^3 - 3abc$

a) 0

b) $6abc$

c) $-3abc$

d) -1

38) Simplify: $(x^2 + 8x + 16)/(x^2 + 6x + 8)$

a) $(x + 4)/(x + 3)$

b) $(x + 6)/(x + 3)$

c) $(x + 4)/(x + 2)$

d) None of the above

39) If a **and** b **are non-zero rational unequal numbers, then**

$[(a - b)^2 - (a + b)^2]/a^2b - ab^2$ **is equal to**

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a) $ab/(a - b)$

b) $-4/(a - b)$

c) 0

d) $-1/(a - b)$

40) If $a + b + c = 10$, $a^2 + b^2 + c^2 = 64$ and $1/a + 1/b + 1/c = 2$ then find the value of abc

a) 6

b) $ab + bc + ca$

c) abc

d) 9

41) If $a^4 - b^4 = 65$ and $a^2 - b^2 = 5$ then find the value of $a^2 + b^2$

a) 12

b) 15

c) 0

d) 13

42) Find the remainder when $x^4 - 2x^3 + 3x^2 - 5x - 8$ is divided by $x - 2$

a) 0

b) -6

c) 3

d) -4

43) If $x^2 - 3x - 1 = 0$ then find the value of $x^3 - 1/x^3$

a) 36

b) -18

c) 18

d) 0

44) If $x + y = 12$ and $xy = 11$ then find $x^2 - y^2$

a) 64

b) 56

c) 110

d) 120

45) If $x - 1/x = 3$ then find the value of $x^2 + 1/x^2$

a) 13

b) 15

c) 11

d) 14

46) If $x^2 + 1/x^2 = \sqrt{3}$, then find the value of $x^{36} + 1/x^{24}$

a) 3

b) -1

c) 2

d) 0

47) If $x^3 = -1$ then find the value of $x^{54} + x^{51}$

a) 2

b) 0

c) -2

d) 4

48) If $a/b = 1 - b/a$ then find the value of $a^3 + b^3$

a) 0

b) ab

c) $a + b$

d) -1

49) If $x = 11 + 6\sqrt{2}$, then find the value of $\sqrt{x} + 1/\sqrt{x}$

a) 4

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b) $3 + 4\sqrt{2}$

c) $(24 + 6\sqrt{2})/7$

d) 0

50) If $a(2 - \sqrt{3}) = b(2 + \sqrt{3}) = 1$ then find the value of $1/a + 1/b$

a) 5

b) 4

c) 0

d) -1

Algebra – Answers and Explanation

1) Answer: D

Solution:

Consider the expressions as $f(x)$ and $g(x)$ respectively

$$f(x) = x^3 + mx^2 + nx + 6$$

And, $g(x) = mx + 6$

Since, $x + 2$ is factor of $x^3 + mx^2 + nx + 6$ and $mx + 6$

$$f(x) = 0 \text{ and } g(x) = 0$$

Then for $x = -2$,

$$f(-2) = (-2)^3 + m(-2)^2 + n(-2) + 6 = 0$$

$$4m - 2n = 2 \text{ --- (1)}$$

$$g(-2) = -2m + 6 = 0$$

$$m = 3$$

Put the value of m in (1)

$$(1) \Rightarrow 12 - 2n = 2$$

$$n = 5$$

$$m + n = 8$$

2) Answer: A

Solution:

$$= x^3 - 13x^2 + 24x - 12$$

$$= x^3 - x^2 - 12x^2 + 12x + 12x - 12$$

$$= x^2(x-1) - 12x(x-1) + 12(x-1)$$

$$= (x-1)(x^2 - 12x + 12)$$

Therefore, $(x^2 - 12x + 12)$ is a factor of the given polynomial.

3) Answer: C

Solution:

$$16p^2 + 4q^2 + 9r^2 - 16pq + 12qr - 24pr = 0$$

Comparing the above expression with the algebraic identity

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$$

As terms containing p is negative then p is negative

$$(-4p)^2 + (2q)^2 + (3r)^2 + 2(-4p)(2q) + 2(2q)(3r) + 2(-4p)(3r) = 0$$

$$(-4p + 2q + 3r)^2 = 0$$

$$2q + 3r = 4p$$

$$\text{Since } p = -1,$$

$$2q + 3r = -4$$

4) Answer: A

Solution:

$$4x^2 + 16y^2 + 12x + 24y + 18 = 0$$

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$$4x^2 + 12x + 9 + 16y^2 + 24y + 9 = 0$$

$$(2x + 3)^2 + (4y + 3)^2 = 0$$

The above expression is 0 only when both terms are 0

$$2x + 3 = 0;$$

$$4y + 3 = 0$$

$$X = -3/2, y = -3/4$$

$$x^3 = -27/8$$

$$y^4 = 81/256$$

$$x^3 - y^4 = -27/8 - 81/256$$

$$= (-864 - 81)/256 = -945/256$$

5) Answer: C

Solution:

$$8a^3 + 125b^3 + 60a^2b + 150ab^2 = 0$$

The above expression is of the form

$$a^3 + b^3 + 3a^2b + 3ab^2 = (a + b)^3$$

$$(2a)^3 + (5b)^3 + 3(2a)^2(5b) + 3(2a)(5b)^2 = 0$$

$$(2a + 5b)^3 = 0$$

$$2a + 5b = 0$$

$$2a = -5b$$

$$a/b = -5/2$$

6) Answer: A

Solution:

$$\text{As, } x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx) \text{ --- (1)}$$

$$\text{Given: } x^2 + y^2 + z^2 = xy + yz + zx$$

$$(1) \Rightarrow x^3 + y^3 + z^3 - 3xyz = 0$$

$$x^3 + y^3 + z^3 = 3xyz \text{ --- (2)}$$

Since $x/y = z$

$$(2) \Rightarrow x^3 + y^3 + z^3 = 3x^2$$

7) Answer: A

Solution:

The given question can be expressed in the form of quadratic equation

$$\text{As, } x^2 - (\text{sum of the terms}) + \text{product of the terms} = 0$$

$$x^2 - 54x + 713 = 0$$

Factors of the above expression will be the required numbers

On solving the above quadratic equation

$$x^2 - 31x - 23x + 713 = 0$$

$$x(x - 31) - 23(x - 31) = 0$$

$$x - 31 = 0; x - 23 = 0$$

The numbers are 23, 31

$$\text{Difference between the two number} = 31 - 23 = 8$$

Alternative Method

$$(x-y)^2 = x^2 + y^2 - 2xy$$

$$(x-y)^2 = x^2 + y^2 - 2xy + 2xy - 2xy$$

$$(x-y)^2 = (x+y)^2 - 4xy$$

$$(x-y)^2 = 54^2 - 4 \times 713$$

$$(x-y)^2 = 2916 - 2852 = 64$$

$$x-y=8$$

8) Answer: B

Solution:

$$(x - 6)(y + 7)(z - 4) \text{ is maximum, only when } (x - 6) = (y + 7) = (z - 4)$$

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$$\text{Let } (x - 6) = (y + 7) = (z - 4) = k$$

$$X = k + 6$$

$$Y = k - 7$$

$$Z = k + 4$$

$$K + 6 + k - 7 + k + 4 = 21$$

$$3k + 3 = 21$$

$$k = 6$$

$$(x - 6)(y + 7)(z - 4) = k^3 (\text{since each term is equal to } k)$$

$$= 6^3 = 216$$

9) Answer: C

Solution:

$$x^2 + 1/x^2 = 7$$

$$x^2 + 1/x^2 + 2 = 7 + 2$$

$$(x + 1/x)^2 = 9$$

$$X + 1/x = 3 \text{ (As } x > 0, \text{ So } -3 \text{ is neglected)}$$

$$x^3 + 1/x^3 = (x + 1/x)^3 - 3(x)(1/x)(x + 1/x)$$

$$x^3 + 1/x^3 = 3^3 - 3(3) = 18$$

10) Answer: A

Solution:

$$X - \sqrt{x} = 132$$

$$X - 132 = \sqrt{x}$$

Squaring on both sides

$$x^2 - 264x + 17424 = x$$

$$x^2 - 265x + 17424 = 0$$

$$(x - 121)(x - 144) = 0$$

$$X = 121, 144$$

By applying the values of x,

$$\text{For } x = 121$$

$$121 - 11 \neq 132$$

$$\text{For } x = 144$$

$$144 - 12 = 132$$

$$\text{So value of } x = 144$$

$$144 - \sqrt{144} = 132$$

$$144 - 12 = 132$$

(or)

By applying the options, one can find the answer

11) Answer: D

Solution:

$$= (5.29 + 3.24 + 8.28) / (5.29 - 3.24)$$

Numerator and denominator is of the form $(a^2 + b^2 + 2ab)$ and $(a^2 - b^2)$ respectively

$$= (2.3^2 + 1.8^2 + 2(2.3 \cdot 1.8)) / (2.3^2 - 1.8^2)$$

$$= (2.3 + 1.8)^2 / (2.3 + 1.8)(2.3 - 1.8)$$

$$= (2.3 + 1.8) / 0.5$$

$$= 4.1 / 0.5 = 8.2$$

12) Answer: D

Solution:

$$= a^3 + b^3 + c^3 - 3abc / (a^2 + b^2 + c^2 - ab - bc - ca)$$

$$\text{As, } a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

$$= (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca) / (a^2 + b^2 + c^2 - ab - bc - ca)$$

$$= a + b + c$$

$$= 208 + 312 + 405 = 925$$

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13) Answer: C

Solution:

$$(y - x)/(y + x) = 2/1$$

By componendo and dividendo method

$$2y/(-2x) = 3/(1)$$

$$-y/x = 3/1$$

$$Y = -3x$$

(or)

$$(y - x)/(y + x) = 2$$

$$Y - x = 2(y + x)$$

$$Y - x = 2y + 2x$$

$$-y = 3x$$

$$Y = -3x$$

14) Answer: B

Solution:

$$= \sqrt{x+1}/\sqrt{x}$$

Squaring the above expression

$$(\sqrt{x+1}/\sqrt{x})^2 = x+1/x + 2 \text{ ---(1)}$$

$$X = 9 - 4\sqrt{5}$$

$$1/x = 1/(9 - 4\sqrt{5})$$

My taking complex conjugate

$$1/x = (9+4\sqrt{5})/(81-80) = 9+4\sqrt{5}$$

$$(1) \Rightarrow (\sqrt{x+1}/\sqrt{x})^2 = 9 - 4\sqrt{5} + 9 + 4\sqrt{5} + 2 = 20$$

$$\sqrt{x+1}/\sqrt{x} = \sqrt{20} = 2\sqrt{5}$$

Another Method:

$$X = 9 - 4\sqrt{5} = 5+4-2(2)(\sqrt{5}) = (\sqrt{5})^2+2^2-2(2)(\sqrt{5})$$

The above expression is of the form, $(a + b)^2 = a^2 + b^2 + 2ab$

$$(\sqrt{5})^2+2^2-2(2)(\sqrt{5}) = (2+\sqrt{5})^2$$

$$\sqrt{x} = 2+\sqrt{5}$$

$$1/\sqrt{x} = 1/2+\sqrt{5}$$

Taking complex conjugate

$$1/\sqrt{x} = (2-\sqrt{5}) / (2+\sqrt{5})(2-\sqrt{5}) = (2-\sqrt{5})/(-1)$$

$$\sqrt{x} + 1/\sqrt{x} = 2+\sqrt{5} - 2+\sqrt{5} = 2\sqrt{5}$$

15) Answer: C

Solution:

This expression $(p^3 + q^3 + 8 - 6pq)$ can be rewritten as,

$$= p^3 + q^3 + 2^3 - 3(2pq)$$

If $a + b + c = 0$, then $a^3 + b^3 + c^3 - 3abc = 0$

Since, $p + q + 2 = 0$ then $p^3 + q^3 + 8 - 6pq = 0$

16) Answer: B

Solution:

$$= (x^3+y^3)/(x^2+y^2)$$

$$= (x + y)(x^2 - xy + y^2) / (x^2 + y^2)$$

Put $xy = 0$

$$(x^3 + y^3)/(x^2 + y^2) = x + y \text{ --- (1)}$$

Since, $y = 2x$

$$(1) \Rightarrow (x^3 + y^3)/(x^2 + y^2) = 3x$$

17) Answer: A

Solution:

$$X + 4/x = 4$$

$$x^2 - 4x + 4 = 0$$

$$(x - 2)^2 = 0$$

$$X = 2$$

$$x^5 + 1/x^3 = 2^5 + 1/2^3$$

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$$= 32 + 1/8$$

$$= (256 + 1)/8$$

$$= 257/8$$

18) Answer: B

Solution:

If the roots of the quadratic equation are real and equal then

$$b^2 - 4ac = 0 \text{ --- (1)}$$

Then in the given quadratic equation $3x^2 - 6x + p = 0$

$$a = 3, b = -6, c = p$$

$$(1) \Rightarrow (-6)^2 - 4(3)(p) = 0$$

$$36 - 12p = 0$$

$$p = 3$$

19) Answer: D

Solution:

$$(a + b - c)^2 = 16(b - c) + (b + c - a)^2$$

$$a^2 + b^2 + c^2 + 2ab - 2bc - 2ca = 16(b - c) + a^2 + b^2 + c^2 -$$

$$2ab + 2bc - 2ca$$

$$4b(a - c) = 16(a - c)$$

$$B = 4$$

20) Answer: A

Solution:

The general form of quadratic equation:

$$x^2 - (\text{sum of the roots})x + \text{product of the roots} = 0$$

$$x^2 - (1/p + 1/q)x + 1/pq = 0$$

$$x^2 - ((p + q)/pq)x + 1/pq = 0$$

$$pqx^2 - (p + q)x + 1 = 0 \text{ is the required equation}$$

21) Answer: C

Solution:

$$2x^2 - 7x + 3 = 0$$

$$2x^2 - 6x - x + 3 = 0$$

$$2x(x - 3) - (x - 3) = 0$$

$$(2x - 1)(x - 3) = 0$$

Therefore the factors are $(2x - 1)$ and $(x - 3)$

$$\text{Sum of the factors} = 2x - 1 + x - 3 = 3x - 4$$

22) Answer: A

Solution:

The general form of quadratic equation:

$$x^2 - (\text{sum of the roots})x + \text{product of the roots} = 0$$

Since roots are A and B

$$\text{Sum of the roots} = A + B$$

$$\text{Product of roots} = AB$$

$$(A + B)^2 = 729$$

$$A + B = \pm 27$$

Since A and B are positive roots $A + B$ should be positive which is equal to 27

$$A + B = 27 \text{ --- (1)}$$

$$(A - B)^2 = 225$$

$$A - B = \pm 15$$

$$A - B = 15 \text{ --- (2)}$$

On solving (1) and (2)

$$A = 21 \text{ and } B = 6$$

The required quadratic equation

$$x^2 - 27x + 126 = 0$$

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23) Answer: C

Solution:

$$X + 1/x = \sqrt{3}$$

Cubing on both sides

$$x^3 + 1/x^3 + 3(x)(1/x)(x+1/x) = 3\sqrt{3}$$

$$x^3 + 1/x^3 + 3\sqrt{3} = 3\sqrt{3}$$

$$x^3 + 1/x^3 = 0$$

$$x^6 = -1$$

$$x^6 + 1/x^{12} = -1 + 1/(-1)^2 = 0$$

24) Answer: B

Solution:

$$a + b + c + d = 2$$

To get the maximum all a, b, c and d should be equal

$$\text{Therefore, } a = b = c = d = 1/2$$

$$(ab + bc + cd + da) = (1/4 + 1/4 + 1/4 + 1/4) = 1$$

25) Answer: C

Solution:

$$X + (1/(x + 1)) = 1$$

Adding 1 on both sides

$$(x + 1) + 1/(x + 1) = 2$$

The above expression is of the form $a + 1/a = 2$

$a = 1$ satisfies the above expression

$$\text{Since } a = x + 1, x = 0$$

$$\text{Therefore, } (x + 1)^3 + 1/(x + 1)^7 = 2$$

26) Answer: C

Solution:

$$P + 1/p + 2 = 0$$

$$P + 1/p = -2 \text{ --- (1)}$$

$$p^2 + 2p + 1 = 0$$

$$(p + 1)^2 = 0$$

$$P = -1$$

(Or) by analyzing the expression (1), we can directly conclude that $p = -1$

$$(p+2)^2 + 1/(p+2)^4 = (1)^2 + 1/(1)^4 = 2$$

27) Answer: A

Solution:

$$(x - 1/x)^2 = x^2 + 1/x^2 - 2(x)(1/x)$$

$$x^2 + 1/x^2 = (x - 1/x)^2 + 2$$

$$x^2 + 1/x^2 = 49 + 2 = 51$$

28) Answer: A

Solution:

$$7p + 1/6p = \sqrt{5}$$

Squaring on both sides

$$(7p + 1/6p)^2 = 5$$

$$49p^2 + (1/36p^2) + 7/3 = 5$$

$$49p^2 + (1/36p^2) + 3/3 + 4/3 = 5$$

$$49p^2 + (1/36p^2) + 1 = 5 - 4/3$$

$$49p^2 + (1/36p^2) + 1 = 11/3$$

29) Answer: C

Solution:

$$x + 1/4x = 6$$

Multiply by 4 on both sides

$$4x + 1/x = 24$$

Squaring on both sides

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$$(4x + 1/x)^2 = 24^2$$

$$16x^2 + 1/x^2 + 2(4x)(1/x) = 576$$

$$16x^2 + 1/x^2 = 568$$

30) Answer: A

Solution:

$$= 2^{16} - 255(2^8 + 1) \text{ ----- (1)}$$

$$255 \text{ can be rewritten as } 256 - 1 = 2^8 - 1$$

$$(1) \Rightarrow 2^{16} - (2^8 - 1)(2^8 + 1)$$

$$= 2^{16} - (2^8 - 1)(2^8 + 1) \text{ --- (2)}$$

$$\text{Apply } a^2 - b^2 = (a + b)(a - b) \text{ for } (2^8 - 1)(2^8 + 1)$$

$$(2) \Rightarrow 2^{16} - (2^{16} - 1)$$

$$= 1$$

31) Answer: C

Solution:

$$= (a - b)/(a + b) - (a + b)/(a - b)$$

$$= [(a - b)^2 - (a + b)^2]/[(a + b)(a - b)]$$

$$= [a^2 + b^2 - 2ab - a^2 - b^2 - 2ab]/[a^2 - b^2]$$

$$= -4ab/(a^2 - b^2)$$

32) Answer: D

Solution:

$$= [(\sqrt{6} + 1)/(\sqrt{6} - 1)] + [(\sqrt{6} - 1)/(\sqrt{6} + 1)]$$

$$= [(\sqrt{6} + 1)^2 + (\sqrt{6} - 1)^2]/[(\sqrt{6})^2 - 1^2]$$

$$= (6 + 1 + 2\sqrt{6} + 6 + 1 - 2\sqrt{6})/(6 - 1)$$

$$= 14/5$$

33) Answer: B

Solution:

$$= x/y - y/x$$

$$= (x^2 - y^2)/xy \text{ --- (1)}$$

$$X = (1 + \sqrt{2})/(1 - \sqrt{2})$$

Taking complex conjugate

$$X = (1 + \sqrt{2})^2/((1 + \sqrt{2})(1 - \sqrt{2})) = (1 + 2 + 2\sqrt{2})/(-1)$$

$$X = -(3 + 2\sqrt{2})$$

$$x^2 = [-(3 + 2\sqrt{2})]^2 = 9 + 8 + 12\sqrt{2} = 17 + 12\sqrt{2}$$

$$y = (1 - \sqrt{2})/(1 + \sqrt{2})$$

Taking complex conjugate

$$y = [(1 - \sqrt{2})(1 - \sqrt{2})]/[(1 + \sqrt{2})(1 - \sqrt{2})] = (1 - \sqrt{2})^2/(1 - 2)$$

$$= (1 + 2 - 2\sqrt{2})/(-1)$$

$$y = 2\sqrt{2} - 3$$

$$y^2 = (2\sqrt{2} - 3)^2 = 8 + 9 - 12\sqrt{2} = 17 - 12\sqrt{2}$$

$$xy = -(2\sqrt{2} + 3)(2\sqrt{2} - 3) = -(8 - 9) = 1$$

$$(1) \Rightarrow (17 + 12\sqrt{2} - 17 + 12\sqrt{2})/1 = 24\sqrt{2}$$

34) Answer: D

$$= (a^2 + ab + b^2)/(a^2 - ab + b^2)$$

By using algebraic identities the numerator and denominator becomes

$$= [(a + b)^2 - ab]/[(a + b)^2 - 3ab] \text{ ----- (1)}$$

Put the values of a + b and ab

$$(1) \Rightarrow [4^2 - 1]/[4^2 - 3] = 15/13$$

35) Answer: B

Solution:

Given:

$$a^3 - b^3 = 26$$

$$(a + b)^2 = 13 + ab \Rightarrow a^2 + b^2 + 2ab = 13 + ab$$

$$\Rightarrow a^2 + b^2 + ab = 13$$

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As we know that,

$$a^3 - b^3 = (a - b)(a^2 + b^2 + ab)$$

Substitute the values in above expression

$$26 = (a - b)(13)$$

$$a - b = 2$$

36) Answer: D

Solution:

As we know the identity, $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$$P + q = \sqrt{5} + (1/\sqrt{5}) + \sqrt{5} - (1/\sqrt{5}) = 2\sqrt{5}$$

$$\text{Applying } (a + b)(a - b) = a^2 - b^2$$

$$Pq = (\sqrt{5} + 1/\sqrt{5})(\sqrt{5} - 1/\sqrt{5}) = 5 - 1/5 = 24/5 \rightarrow p^2 + q^2 = (p+q)^2 - 2pq$$

Substitute the values of $(p + q)$ and pq in above expression

$$p^2 + q^2 = (2\sqrt{5})^2 - 48/5 = 52/5$$

Then,

$$p^3 + q^3 = (p + q)(p^2 - pq + q^2)$$

$$p^3 + q^3 = 2\sqrt{5}(52/5 - 24/5) = 2\sqrt{5}(28/5) = 56/\sqrt{5}$$

37) Answer: A

Solution:

$$\text{As, } a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

Put the value of $a + b = -c$ in above expression

$$\text{Then, } a^3 + b^3 + c^3 - 3abc = (-c + c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

$$a^3 + b^3 + c^3 - 3abc = 0$$

38) Answer: C

Solution:

$$= (x^2 + 8x + 16)/(x^2 + 6x + 8) \text{ ----- (1)}$$

The factors of $x^2 + 8x + 16$ is $(x + 4)(x + 4)$

The factors of $x^2 + 6x + 8$ is $(x + 4)(x + 2)$

$$\text{Substituting equ.(1)} \Rightarrow (x + 4)(x + 4)/(x + 4)(x + 2) = (x + 4)/(x + 2)$$

Thus, $(x + 4)/(x + 2)$ is the required answer

39) Answer: B

Solution:

$$= [(a - b)^2 - (a + b)^2]/a^2b - ab^2$$

$$= (a^2 + b^2 - 2ab - a^2 - b^2 - 2ab)/ab(a - b)$$

$$= -4ab/ab(a - b)$$

$$= -4/(a - b)$$

40) Answer: D

Solution:

$$1/a + 1/b + 1/c = 2$$

$$(ab + bc + ca)/abc = 2 \text{ ----- (1)}$$

$$abc = (ab + bc + ca)/2$$

$$\text{As, } (a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$$

Substitute the values of $a + b + c$ and $a^2 + b^2 + c^2$ in above expression

Then it becomes,

$$100 = 64 + 2(ab + bc + ca)$$

$$(ab + bc + ca) = 18$$

$$(1) \Rightarrow 18/abc = 2$$

$$abc = 9$$

41) Answer: D

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Solution:

Based on algebraic identity, $a^4 - b^4 = (a^2 + b^2)(a^2 - b^2)$

$$(a^2 + b^2) = (a^4 - b^4) / (a^2 - b^2) = 65/5 = 13$$

42) Answer: B

Solution:

To find the remainder value, put $x = 2$ in the given expression

$$f(x) = x^4 - 2x^3 + 3x^2 - 5x - 8$$

$$f(2) = 2^4 - 2(2)^3 + 3(2)^2 - 5(2) - 8$$

$$= 16 - 16 + 12 - 10 - 8 = -6$$

43) Answer: A

Solution:

$$x^2 - 3x - 1 = 0$$

$$\div \text{ by } x \Rightarrow x - 3 - 1/x = 0$$

$$X - 1/x = 3$$

By using algebraic identity $(a - b)^3 = a^3 - b^3 - 3ab(a - b)$

$$(x - 1/x)^3 = x^3 - 1/x^3 - 3(x)(1/x)(x - 1/x)$$

$$3^3 = x^3 - 1/x^3 - 3(3)$$

$$x^3 - 1/x^3 = 27 + 9 = 36$$

44) Answer: D

Solution:

$$\text{As, } x^2 - y^2 = (x + y)(x - y) \text{ ----- (1)}$$

By using identity $(x - y)^2 = (x + y)^2 - 4xy$

$$(x - y)^2 = 12^2 - 4(11) = 144 - 44 = 100$$

$$X - y = 10$$

$$(1) \Rightarrow x^2 - y^2 = 12 \cdot 10 = 120$$

45) Answer: C

Solution:

$$(x - 1/x)^2 = x^2 + 1/x^2 - 2(x)(1/x)$$

$$3^2 = x^2 + 1/x^2 - 2$$

$$x^2 + 1/x^2 = 11$$

46) Answer: D

Solution:

$$x^2 + 1/x^2 = \sqrt{3}$$

Cubing on both sides

$$(x^2 + 1/x^2)^3 = (\sqrt{3})^3$$

$$x^6 + 1/x^6 + 3(x^2)(1/x^2)(x^2 + 1/x^2) = 3\sqrt{3}$$

$$x^6 + 1/x^6 = 3\sqrt{3} - 3\sqrt{3} = 0$$

$$x^{12} + 1 = 0$$

$$x^{12} = -1$$

$$\Rightarrow x^{36} + 1/x^{24} = (x^{12})^3 + 1/(x^{12})^2 = (-1)^3 + 1/(-1)^2 = 0$$

47) Answer: B

Solution:

$$x^{54} + x^{51} = x^{51}(x^3 + 1) \text{ ----- (1)}$$

Substitute the value of x^3 in (1)

$$(1) \Rightarrow x^{54} + x^{51} = 0$$

48) Answer: A

Solution:

Given

$$a/b = 1 - b/a$$

The above expression is rewritten as,

$$a/b + b/a = 1$$

$$(a^2 + b^2)/ab = 1$$

$$(a^2 + b^2) = ab$$

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As per algebraic identity,

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2) \text{ ----- (2)}$$

Substitute the value of $a^2 + b^2$

$$(2) \Rightarrow a^3 + b^3 = (a + b)(ab - ab) = 0$$

49) Answer: C

Solution:

$$X = 11 + 6\sqrt{2}$$

$$X = (9 + 2 + 6\sqrt{2})$$

$$X = (3^2 + (\sqrt{2})^2 + 2(3)(\sqrt{2}))$$

$$x = (3 + \sqrt{2})^2$$

$$\sqrt{x} = (3 + \sqrt{2})$$

$$1/\sqrt{x} = 1/(3 + \sqrt{2})$$

Taking complex conjugate

$$1/\sqrt{x} = (3 - \sqrt{2})/((3 + \sqrt{2})(3 - \sqrt{2})) = (3 - \sqrt{2})/(9 - 2) = (3 - \sqrt{2})/7$$

$$\sqrt{x} + 1/\sqrt{x} = (3 + \sqrt{2}) + ((3 - \sqrt{2})/7)$$

$$= (21 + 7\sqrt{2} + 3 - \sqrt{2})/7 = (24 + 6\sqrt{2})/7$$

50) Answer: B

Solution:

$$a(2 - \sqrt{3}) = b(2 + \sqrt{3}) = 1$$

$$\text{This is same as, } a(2 - \sqrt{3}) = 1 \text{ \& } b(2 + \sqrt{3}) = 1$$

$$1/a = (2 - \sqrt{3}) \text{ and } 1/b = (2 + \sqrt{3})$$

$$\text{So, } 1/a + 1/b = (2 - \sqrt{3}) + (2 + \sqrt{3}) = 4$$

Number System

1) 0.5656..... + 0.4343..... is equal to

a) 1.44....

b) 1

c) 2.33.....

d) 0.766.....

2) Find the value of $(0.84 \times 0.35)/(4.9 \times 0.2)$

a) 0.3

b) 0.2

c) 0.03

d) 0.02

3) Which of the following option is correct?

a) $5/18 > 0.3.... > 7/6$

b) $0.3... > 5/18 > 7/6$

c) $7/6 > 0.3.... > 5/18$

d) $7/6 > 5/18 > 0.3...$

4) Arrange the following irrational numbers in descending order

$2\sqrt{5}, 3\sqrt{6}, 2\sqrt{2}$

a) $3\sqrt{6} > 2\sqrt{5} > 2\sqrt{2}$

b) $3\sqrt{6} < 2\sqrt{5} < 2\sqrt{2}$

c) $3\sqrt{6} < 2\sqrt{5} > 2\sqrt{2}$

d) None of the above

5) Which of the following has a terminating decimal expression?

a) $8/9$

b) $5/12$

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c) $2/11$

d) $19/25$

6) Simplify: $a \div \{[a^2/(a-4)] + [4a/(4-a)]\}$

a) $a/(a-4)$

b) $(a-4)/a$

c) 1

d) 0

7) Find out which of the following sets form co-prime numbers

a) (21, 42)

b) (43, 129)

c) (18, 35)

d) (12, 36)

8) $3^{51} + 3^{52} + 3^{53} + 3^{54}$ is divisible by

a) 11

b) 16

c) 25

d) 30

9) Which one of the following fractions lays in between $5/7$ and $15/17$

a) $4/7$

b) $16/17$

c) $95/119$

d) $106/119$

10) When the largest four digit number is divided by a number and the result is added with same number

the answer obtained is smallest five digit number.

Find the number/numbers?

a) $3/4$, 89

b) $3/2$, 999

c) $5/2$, 9999

d) 1, 9999

11) Find the average of first 40 even numbers

a) 41

b) 40

c) 38

d) 42

12) If $1/54.76 = 0.01826$ then find the value of $1/18.26$

a) 0.05476

b) 0.005476

c) 0.8956

d) 0.08956

13 Find the irrational number from the following

a) 23

b) $3/5$

c) $\sqrt{2}$

d) $\sqrt{9}$

14) If @ denotes +, # denotes \times , \$ denotes $-$ and ^ denotes \div then find which of the following options are correct

a) $7 @ 7 \# 7 \$ 7 ^ 7 = 59$

b) $7 \# 7 @ 7 \$ 7 ^ 7 = 57$

c) $7 \$ 7 \# 7 @ 7 ^ 7 = 55$

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d) $7\#7\$7^7@7=55$

15) $2.5656.... + 5.4747..... - 3.3131..... = ?$

a) $52/11$

b) $54/11$

c) $67/19$

d) $119/123$

16) Find the unit digit of the following product

$(4336)^{344} \times (3457)^{433}$

a) 2

b) 3

c) 4

d) 8

17) Which of the following number is divisible by 16?

a) 456856

b) 356884

c) 760272

d) 650372

18) If $67542x356$ is divisible by 11 then find the value of x

a) 5

b) 4

c) 6

d) 7

19) If $53x68$ is divisible by 9 then find the value of x

a) 6

b) 4

c) 3

d) 5

20) The difference between the place value and the face value of 8 in 28732 is-

a) 1572

b) 79992

c) 7992

d) 792

21) Which of the following number is divisible by 8?

a) 234564

b) 435568

c) 897426

d) 769582

**22) Find the unit digit of the product:
 $(2348 \times 9876 \times 3487 \times 1983)$**

a) 5

b) 6

c) 8

d) 9

23) Which of the following number is completely divisible by 6?

a) 983356

b) 982346

c) 695248

d) 983256

24) Check for the following numbers which are completely divisible by 12?

a) 65428

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- b) 21682
c) 11472
d) None of the above
- 25) Find the average of first 28 odd numbers**
a) 492
b) 28
c) 520
d) 32
- 26) Find the number of times the number 3 comes on writing from 1 to 100?**
a) 19
b) 18
c) 21
d) 20
- 27) If product of two numbers and sum of their reciprocals is 90 and $\frac{7}{30}$ respectively then find the sum of squares of those two numbers**
a) 261
b) 271
c) 255
d) 245
- 28) If the sum of the positive number and its reciprocal is $\frac{37}{6}$ then find the square of that number.**
a) $\frac{4}{9}$
b) 36
c) $\frac{49}{36}$
d) 49
- 29) If the difference between two numbers is 2 and result of the division of one number by another number is $\frac{14}{15}$ then find the sum of two numbers.**
a) 56
b) 68
c) 58
d) 76
- 30) If the sum of three consecutive odd numbers is 51 then find the largest of those three numbers**
a) 11
b) 21
c) 23
d) 19
- 31) Three numbers are in arithmetic progression if the difference between the largest and smallest number is 8 and the sum of middle number and last number is 60 then find the smallest number**
a) 23
b) 27
c) 24
d) 28
- 32) Three natural numbers are in geometric progression if the product of smallest and largest number is 16. If the difference between the middle number and largest number is 4 then find the cube of largest number.**

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a) 512

b) 64

c) 1000

d) 343

33) The sum of squares of two positive numbers is 145 and difference between those two square values is 17.

Then find the sum of two numbers

a) 16

b) 17

c) 18

d) 19

34) If $xyz=300$, $x/y=5/6$ and $y/z=3/5$ then find the value of x^3

a) 216

b) 1000

c) 343

d) 125

35) If the sum of two numbers is thrice of the difference between those two numbers then find the ratio between the largest and smallest number.

a) 2:1

b) 3:2

c) 2:3

d) 4:3

36) On adding a number by three fourth of itself the answer obtained is 4 less than the twice of the number. Find the square of the number?

a) 225

b) 225/256

c) 256

d) 196

37) Three numbers are in arithmetic progression, if their sum is equal to 489 and the smallest number is 6 less than the largest number then find the largest number

a) 163

b) 156

c) 166

d) 176

38) Find the difference between the squares of the consecutive natural numbers

a) n^2-1

b) $1-n^2$

c) $2n+1$

d) $2n-1$

39) $8^3+9^3+\dots\dots\dots+14^3=?$

a) 10241

b) 10393

c) 11353

d) 12458

40) If the difference between a natural number and twice of its reciprocal is $71/6$ then find that number

a) 6

b) 8

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c) 14

d) 12

41) Simplify the following:

$$(5\frac{4}{7} + 4\frac{3}{14} - 5\frac{2}{21}) \div (1/7)$$

a) 33.75

b) 34

c) 32.83

d) 33.25

42) Simply: $(0.9 \times 0.009 \times 0.81) \div (0.0729)$

a) 0.09

b) 0.009

c) 0.81

d) 0.081

43) Find the sum of $12+15+18+21+24+\dots+99$

a) 1667

b) 1697

c) 1665

d) 1698

44) $5^3+5^4+5^5+5^6+5^7=?$

a) 98425

b) 96325

c) 97625

d) 97725

45) Find the sum of the squares of first 35 natural numbers?

a) 15620

b) 14520

c) 14930

d) 14910

46) If 616 number of trees need to be planted in a rectangular field and the number of rows is 6 more than the number of columns then find the number of rows

a) 22

b) 28

c) 26

d) 24

47) Find the value of $1-2-4-6-8-10-12-14-\dots-46$

a) -543

b) -631

c) -553

d) -551

48) If the sum of three consecutive odd natural numbers is 45 then find the product of those numbers

a) 3315

b) 3325

c) 3365

d) 4358

49) $(6^2+6^5) \div 93 = 42 \times 2^a$, find the value of a

a) 2

b) 3

c) 1

d) 0

50) $2541-1456+3254=x^2+(75 \times 260 \times 13/78)$ find x

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a) 32

b) 35

c) 33

d) 45

Number System – Answers and Explanation

1) Answer: B

Solution:

$$0.5656... = (56.5656...)/100$$

$$\text{Let } 0.5656... = x$$

Then the above expression becomes

$$x = 56/100 + x/100$$

$$99x/100 = 56/100$$

$$x = 56/99$$

Similarly, 0.4343... can be written as 43/99

$$0.5656... + 0.4343... = 56/99 + 43/99 = 1$$

2) Answer: A

Solution:

$$= (0.84 \times 0.35) / (4.9 \times 0.2)$$

On simplification answer will be 0.3

3) Answer: C

Solution:

$$\text{As, } 0.3... = 0.333..$$

$$5/18 = 0.277....$$

$$7/6 = 1.166....$$

On comparing the above three values options C will be the correct one.

4) Answer: A

Solution:

For easy comparison of irrational numbers square each number and compare them

$$(3\sqrt{6})^2 = 54$$

$$(2\sqrt{5})^2 = 20$$

$$(2\sqrt{2})^2 = 8$$

By analyzing the above answers option a will be the correct answer.

5) Answer: D

Solution:

$$8/9 = 0.888....$$

$$5/12 = 0.4166...$$

$$2/11 = 0.1818.....$$

$$19/25 = 0.76$$

6) Answer: C

Solution:

$$= a \div \{[a^2/(a-4)] + [4a/(4-a)]\}$$

$$= a \div \{[a^2/(a-4)] - [4a/(a-4)]\}$$

$$= a / [(a^2 - 4a)/(a-4)]$$

$$= a / [a(a-4)/(a-4)]$$

$$= 1$$

7) Answer: C

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Two numbers have only 1 as the Common Factor is known as co-prime numbers. All the prime numbers are co-prime numbers

Factors of 18 are 1,2,3,6 and 18

Factors of 35 are 1,5,7 and 35

The only Common factor between 18 and 35 is 1

(18,35) are coprime numbers

8) Answer: D

Solution:

$$3^{51} + 3^{52} + 3^{53} + 3^{54} = 3^{51}(1 + 3^1 + 3^2 + 3^3)$$

$$= 3^{51}(1 + 3 + 9 + 27)$$

$$= 3^{51} \times 40$$

The possible answer is 30

9) Answer: C

Solution:

By analyzing the options, $4/7 < 5/7$ and $16/17 > 15/17$

So option a and b are neglected

Since denominator 119 is product of the denominators of two given fractions

Check for the average of those two terms as average value lies between those two fractions only.

$$\text{Average of } 5/7 \text{ and } 15/17 = (5/7 + 15/17)/2$$

$$= (190/119)/2 = 95/119$$

10) Answer: D

Solution:

Largest 4 digit number = 9999

Smallest 5 digit number = 10000

$$10000 = 9999/x + x$$

$$x^2 - 10000x + 9999 = 0$$

$$x^2 - 9999x - x + 9999 = 0$$

$$(x - 9999)(x - 1) = 0$$

$$x = 1, 9999$$

11) Answer: A

Solution:

Solution:

$$\text{Sum of first } n \text{ even number} = n(n+1)$$

$$\text{Sum of first 40 even number} = 40 \times 41$$

$$\text{Average of first 40 even number} = (40 \times 41)/40 = 41$$

12) Answer: A

Solution:

$$\text{Given, } 1/54.76 = 0.01826$$

$$\text{Rewrite as, } 1/0.01826 = 54.76$$

Divide by 1000

$$1/(1000 \times 0.01826) = 54.76/1000$$

$$1/18.26 = 0.05476$$

13) Answer: C

Solution:

An Irrational Number is a real number that cannot be written as a simple fraction.

$$\sqrt{2} = 1.41421356237$$

14) Answer: D

Solution:

Check with options

$$\text{a) } 7 \times 7 \times 7 \times 7 = 59$$

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$$= 7+7 \times 7-7 \div 7$$

$$= 55 \neq 59$$

$$\text{b) } 7\#7@7\$7^7=57$$

$$= 7 \times 7 + 7 - 7 \div 7$$

$$= 55 \neq 57$$

$$\text{c) } 7\$7\#7@7^7=55$$

$$= 7-7 \times 7 + 7 \div 7$$

$$= -41 \neq 55$$

$$\text{d) } 7\#7\$7^7@7=55$$

$$= 7 \times 7 - 7 \div 7 + 7$$

$$= 49 - 1 + 7$$

$$= 55$$

So, option d is correct

15) Answer: A

Solution:

$$= 2.5656.... + 5.4747..... - 3.3131..... (1)$$

$$2.5656..... = 2 + 0.5656..... = 2 + x \text{ ----}(2)$$

$$x = 0.5656.....$$

Multiply by 100,

$$100x = 56.565656...$$

$$100x = 56 + x$$

$$99x = 56$$

$$x = 56/99$$

$$(2) \Rightarrow 2.5656.... = 2 + 56/99 = 2 \frac{56}{99}$$

$$\text{Similarly } 5.4747... = 5 \frac{47}{99}$$

$$3.3131.... = 3 \frac{31}{99}$$

$$(1) \Rightarrow 2 \frac{56}{99} + 5 \frac{47}{99} - 3 \frac{31}{99}$$

$$= (2+5-3) + (56/99 + 47/99 - 31/99)$$

$$= 4 + (72/99)$$

$$= 4 \frac{8}{11} = 52/11$$

16) Answer: A

Solution:

For finding the unit digit of the given product first find the last digit of each term.

Check the periodicity of unit digit. Here 6 and 7 are unit digit

Its respective periodicity is 1 and 4

For periodicity 1 replace the given power by 1 and for periodicity 4 check for remainder by dividing the power with this periodicity

$$433/4 \Rightarrow \text{remainder } 1$$

So, the given question is rewritten as,

$$= 6^1 \times 7^1$$

As unit digit of above product is 2

So, the unit digit of the complete product is 2.

17) Answer: C

Solution:

If the last four digit of the given number is divisible by 16 then the given number is completely divisible by 16

$$\text{a) } 456856$$

$$\text{Checking for last four digit: } 6856/16 \text{ ---remainder is } 4$$

$$\text{b) } 356884$$

$$\text{Checking for last four digit: } 6884/16 \text{ ---remainder is } 4$$

$$\text{c) } 760272$$

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Checking for last four digit: $0272/16$ –remainder is 0

d) 650372

Checking for last four digit: $0372/16$ ---remainder is 4

Since, option c is gives remainder 0 therefore option c is correct

18) Answer: C

Solution:

If the difference between the sum of the digits in odd places and the sum of the digits in even places of the given number is zero then the given number is said to be divisible by 11.

Sum of odd placed digits – sum of the even placed digit =0

$$(6+5+2+3+6)-(7+4+x+5)=0$$

$$22-16-x=0$$

$$x=6$$

19) Answer: D

Solution:

If a number is divisible by 9 then its sum of the digits is equal to multiple of 9

Therefore, $5+3+x+6+8$ =multiple of 9

$22+x=27$ (As 27 is nearest multiple of 9)

$$x=27-22=5$$

20) Answer: C

Solution:

In 28732, place value of 8 = 8000

And the face value is 8

$$\Rightarrow \text{So } (8000 - 8) = 7992$$

21) Answer: B

Solution:

If the last three digit of the given number is divisible by 8 then the given number is completely divisible by 8.

a) 234564

Last three digit: $564/8$ –remainder is 4

b) 435568

Last three digits: $568/8$ —reaminder is 0

c) 897426

Last three digits: $426/8$ ---remainder is 2

d) 769582

Last three digits: $582/8$ —remainder is 6

Option b will be answer as it gives remainder as 0.

22) Answer: C

Solution:

Unit digit of the product of such large numbers can be found out by multiplying the last digits alone of each term and the unit digit of such product is unit digit of the complete product.

Unit digits are: 8, 6, 7, and 3

$$\text{Product} = 8*6*7*3=1008$$

Unit digit is 8

23) Answer: D

Solution:

If a number is divisible by 6 then the same number should be divisible by its factors 2 and 3.

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As all given numbers are even then the given numbers are divisible by 2

If the sum of the digits of the number is multiple of 3 then that number is divisible by 3.

a) $9+8+3+3+5+6=34$ is not multiple of 3

b) $9+8+2+3+4+6=32$ is not multiple of 3

c) $6+9+5+2+4+8=34$ is not multiple of 3

d) $9+8+3+2+5+6=33$ is multiple of 3

So, option d will be the correct answer.

24) Answer: C

Solution:

If the given number is divisible by 4 and 3 the factors of 12 then the given number is divisible by 12.

Divisibility by 3: sum of the digits of the given number is multiple of 3

Divisibility by 4: Last two digits of the given number is divisible by 4

a) 65428

Sum of the digits = $6+5+4+2+8=25$ not a multiple of 3.

The given number is not divisible by 12 though the last two digits are multiple of 4

b) 21682

Sum of the digits = $2+1+6+8+2=19$ not a multiple of 3. The given number is not divisible by 12.

c) 11472

Sum of the digits = $1+1+4+7+2=15$ multiple of 3

And last two digits are divisible by 4

So, this number is divisible by 12.

25) Answer: B

Solution:

Sum of first n odd number = n^2

Sum of first 28 odd number = 28^2

Average of first 28 odd number = $(28 \times 28)/28 = 28$

26) Answer: D

Solution:

Such numbers are,

3, 13, 23, 33, 93 = 11 (as 33 contains 3 two times)

30, 31, 32, 33, 39 = $11 - 2 = 9$ (As 33 is counted already so 2 is subtracted)

So total number of 3 = $11 + 9 = 20$

27) Answer: A

Solution:

Let the two numbers are x and y

$xy = 90$

$1/x + 1/y = 7/30$

$(y+x)/xy = 7/30$

$(x+y)/90 = 7/30$

$x+y = 21$

As per algebraic identity,

$x^2 + y^2 = (x+y)^2 - 2xy$

$x^2 + y^2 = (21)^2 - 2(90)$

$x^2 + y^2 = 441 - 180 = 261$

28) Answer: B

Solution:

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Let the number be x

$$x+1/x=37/6$$

$$(x^2+1)/x=37/6$$

$$6x^2+6=37x$$

$$6x^2-37x+6=0$$

$$6x^2-36x-x+6=0$$

$$6x(x-6)-(x-6)=0$$

$$(6x-1)(x-6)=0$$

$$x=1/6, 6$$

$$x^2=1/36, 36$$

Option b is correct

29) Answer: C

Solution:

Let the two numbers are x and y ($x > y$)

$$x-y=2$$

$$y/x=14/15 \text{ (As, } 15 > 14)$$

$$y/x=14a/15a$$

$$x-y=15a-14a=a$$

As, $x-y=2$ given therefore, $a=2$

$$x+y=15a+14a$$

$$=29a=29 \times 2$$

$$=58$$

30) Answer: D

Solution:

Let the three consecutive odd numbers are $(x-2)$, x , $(x+2)$

Sum of those three numbers = 51

$$(x-2)+x+(x+2)=51$$

$$3x=51$$

$$x=17$$

Since largest of three is $(x+2) = 17+2=19$

31) Answer: C

Solution:

Let the numbers are: $(x-a)$, x , $(x+a)$

a is the difference between the consecutive numbers

Largest number - smallest number = 8

$$(x+a)-(x-a)=8$$

$$2a=8$$

$$a=4$$

Middle number + last number = 60

$$x+(x+a)=60$$

$$2x+a=60$$

$$x=28$$

Smallest number = $x-a$

$$=28-4=24$$

32) Answer: A

Solution:

Let the three numbers are: x/a , x , ax

a be the ratio between the two numbers

Smallest number * largest number = 16

$$x/a * ax=16$$

$$x^2=16$$

$$x=\pm 4$$

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$x=4$ (As all the numbers are natural numbers, neglect the negative value)

Largest number - middle number = 4

$$ax - x = 4$$

$$x(a-1) = 4$$

$$a-1 = 1$$

$$a = 2$$

Cube of largest number = $(ax)^3$

$$= (2 \cdot 4)^3$$

$$= 512$$

33) Answer: B

Solution:

Let the number be: x and y

$$x^2 + y^2 = 145 \text{ ----(1)}$$

$$x^2 - y^2 = 17 \text{ -----(2)}$$

$$(1) + (2) \Rightarrow 2x^2 = 162$$

$$x^2 = 81, x = 9$$

Put the value of x^2 in (1)

$$\text{Then, } y^2 = 145 - 81 = 64$$

$$y = 8$$

$$x + y = 9 + 8$$

$$= 17$$

34) Answer: D

Solution:

Given:

$$xyz = 300 \text{ ---(1)}$$

$$x/y = 5/6 \text{ ----(2)}$$

$$y/z = 3/5 \text{ ---(3)}$$

Product of above three equation = $(xyz)(x/y)(y/z)$

$$x^2y = 150 \text{ ---(3)}$$

$$\text{From (2) } y = 6x/5$$

$$(3) \Rightarrow x^2(6x/5) = 150$$

$$x^3 = 125$$

35) Answer: A

Solution:

Let the two numbers are x and y ($x > y$)

Sum of two numbers = 3 * difference between the two numbers

$$x + y = 3(x - y)$$

$$x + y = 3x - 3y$$

$$4y = 2x$$

$$x:y = 2:1$$

36) Answer: C

Solution:

Let the number be x

$$x + 3x/4 = 2x - 4$$

$$7x/4 = 2x - 4$$

$$x/4 = 4$$

$$x = 16$$

$$x^2 = 256$$

37) Answer: C

Solution:

Let the numbers be $(x-a)$, x , $(x+a)$

a be the difference between the consecutive number

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$$x-a+x+x+a=489$$

$$3x=489$$

$$x=163$$

Since smallest number is 6 less than the largest number.

$$(x-a)=(x+a)-6$$

$$-2a=-6$$

$$a=3$$

Largest number $=x+a$

$$=163+3=166$$

38) Answer: C

Solution:

Let the consecutive natural numbers are n and $n+1$

Difference between the squares of the two,

$$= (n+1)^2 - n^2$$

$$= n^2 + 2n + 1 - n^2$$

$$= 2n + 1$$

39) Answer: A

Solution:

Sum of the cube of first n natural number =

$$\left(\frac{n(n+1)}{2} \right)^2$$

$$8^3 + 9^3 + \dots + 14^3 = (1^3 + 2^3 + 3^3 + \dots + 14^3) -$$

$$(1^3 + 2^3 + 3^3 + \dots + 7^3)$$

Apply the formula,

$$12^3 + 13^3 + \dots + 22^3 = (14 \cdot 15/2)^2 - (7 \cdot 8/2)^2$$

$$= 7^2(15^2 - 4^2)$$

$$= 209 \cdot 49 = 10241$$

40) Answer: D

Solution:

Let the number be x .

Twice of its reciprocal $= 2/x$

$$x - 2/x = 71/6$$

$$x^2 - 2 = 71x/6$$

$$6x^2 - 12 = 71x$$

$$6x^2 - 71x - 12 = 0$$

$$6x^2 - 72x + x - 12 = 0$$

$$6x(x-12) + (x-12) = 0$$

$$x=12, x=-1/6$$

As, only natural number is to be considered then the negative number has to be neglected.

The required number $= 12$

41) Answer: C

Solution:

$$= (5 \frac{4}{7} + 4 \frac{3}{14} - 5 \frac{2}{21}) \div (1/7)$$

$$= [(5+4-5) + (4/7 + 3/14 - 2/21)] \times 7$$

$$= 4 + [(24+9-4)/42] \times 7$$

$$= [4 (29/42)] \times 7$$

$$= (197/42) \times 7$$

$$= 197/6$$

$$= 32.83$$

42) Answer: A

Solution:

$$= (0.9 \times 0.009 \times 0.81) \div (0.0729)$$

$$= (0.9 \times 0.009 \times 0.9 \times 0.9) \div (729 \times 10^{-4})$$

$$= (9 \times 10^{-1} \times 9 \times 10^{-3} \times 9 \times 10^{-1} \times 9 \times 10^{-1}) \div (729 \times 10^{-4})$$

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$$= (729 \times 9 \times 10^{-6}) \div (729 \times 10^{-4})$$

$$= 9 \times 10^{-2}$$

$$= 0.09$$

43) Answer: C

Solution:

$$= 12+15+18+21+24+\dots+99$$

$$= 3(4+5+6+7+8+\dots+33)$$

$$= 3[(1+2+3+\dots+33) - (1+2+3)]$$

$$\text{As sum of } n \text{ natural numbers} = n(n+1)/2$$

$$= 3[((33 \times 34)/2) - 6]$$

$$= 3[561 - 6]$$

$$= 3 \times 555$$

$$= 1665$$

44) Answer: C

Solution:

$$= 5^3 + 5^4 + 5^5 + 5^6 + 5^7$$

$$= 5^3(1 + 5 + 5^2 + 5^3 + 5^4)$$

$$= 125(6 + 25 + 125 + 625)$$

$$= 125 \times 781$$

$$= (1000 \times 781)/8$$

$$= 781000/8$$

$$= 97625$$

45) Answer: D

Solution:

Sum of the squares of first n natural number =

$$n(n+1)(2n+1)/6$$

$$= (35 \times 36 \times 71)/6$$

$$= 14910$$

46) Answer: B

Solution:

Let the number of columns = x

Then the number of rows = $x+6$

As 616 trees need to be planted in this area, then

$$x(x+6) = 616$$

$$x^2 + 6x - 616 = 0$$

$$x^2 + 28x - 22x - 616 = 0$$

$$x(x+28) - 22(x+28) = 0$$

$$x = 22, -28$$

Neglect negative value then $x = 22$

Number of rows = $x+6$

$$= 22+6 = 28$$

47) Answer: D

Solution:

$$= 1-2-4-6-8-10-12-14-\dots-46$$

$$= 1-2(1+2+3+\dots+23)$$

$$= 1-2(23 \times 24/2)$$

$$= 1-552$$

$$= -551$$

48) Answer: A

Solution:

Let the three numbers are $(a-2)$, a , $(a+2)$

Sum of three numbers = 45

$$a-2+a+a+2 = 45$$

$$3a = 45$$

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$$a=15$$

$$(a-2)=13$$

$$(a+2)=17$$

$$\text{Product of three numbers}=(a-2)a(a+2)$$

$$=13*15*17=3315$$

49) Answer: C

Solution:

$$(6^2+6^5)\div 93=42\times 2^a$$

$$6^2(1+6^3)\div 93=42\times 2^a$$

$$(36*217)/93=42\times 2^a$$

$$84=42\times 2^a$$

$$2=2^a$$

On comparing the powers, $a=1$

50) Answer: C

Solution:

$$2541-1456+3254=x^2+(75\times 260\times 13/78)$$

$$4339=x^2+3250$$

$$x^2=1089$$

$$x=33$$

Ratio and Proportion

1) Two numbers are in the ratio 3 : 2 . After adding 2 and 4 to them respectively the ratio become 3 : 4 . Find the bigger number?

- a) 2
- b) 3
- c) 4
- d) 1

2) The present age of Ram and Shyam are in the ratio 2 : 5 . After 3 years ratio of their age's become 3 : 7 . If Aayam who is 10 years older than Ram then find Aayam's age before 5 years?

- a) 29
- b) 31
- c) 40
- d) 35

3) A college had ratio of 3 : 7 (Boy : Girl) . 30% girls and 10% boys were absent. Find the girls present if the total students were 200?

- a) 120
- b) 125
- c) 98
- d) 100

4) CP and SP of an article are in the ratio 5 : 7 . While MP and Discount of an article are in the ratio 20 : 6 . If the profit on an article is Rs. 100 then find the S.P of the article?

- a) Rs. 350
- b) Rs. 400
- c) Rs. 325
- d) Rs. 300

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5) The ratio of the speeds of car and bus is 5 : 3 . If the car covers 200 kms in 4 hour then find time taken by the bus to cover the distance of 270 kms?

- a) 6 hours
- b) 9 hours
- c) 10 hours
- d) 12 hours

6) Speeds of three cars are C_1 , C_2 , C_3 are in the ratio of 2 : 4 : 5 .Find the time taken by Car's to cover the same distance ?

- a) 10 : 5 : 3
- b) 10 : 5 : 4
- c) 2 : 4 : 5
- d) 5 : 2 : 3

7) The profit percent of an article is 12.5%. Discount given on the article was 16.66%.If the difference between CP and MP is Rs.70. Find the selling price?

- a) 225
- b) 250
- c) 300
- d) 350

8) If $A : B = 8 : 7$ and A is 21 more than B then find the sum of A and B.

- a) 325
- b) 315
- c) 285
- d) 295

9) A person has some rupee notes in his pockets of 10, 20, 50 in the ratio of 5 : 6 : 8.Later he distributed whole amount to his two daughters in the ratio of 3:2. Find the amount received by both the daughters if younger received 4600?

- a) Rs. 11400
- b) Rs. 12000
- c) Rs. 13050
- d) Rs. 15000

10) Income of A is 120% of B. Income of B is 150% of C. Income of D is 50% of the sum of A and C. Find the income of A if the difference between income of B and D is Rs. 250?

- a) Rs. 4500
- b) Rs. 4000
- c) Rs. 5000
- d) Rs. 6500

11) A person regularly buys 2 litres of milk in the ratio of milk to water is 4 : 1, Find the amount of water, if he reduced half litre of milk consumed actually.

- a) 0.2 litre
- b) 0.5 litre
- c) 0.8 litre
- d) 0.3 litre

12) A person want to distribute his will to his two sons A and B in the ratio of 2 : 3. After some days

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person changes his mind and re- distribute his will with the new ratio of 3 : 5. In this process B got 2 lakh rupees less than before. Find the actual will of the person?

- a) 60 lakh
- b) 80 lakh
- c) 70 lakh
- d) 50 lakh

13) If $A/2 = B/3 = C/7$ then find the value of $(A + B) : (B+C) : (C+A) = ?$

- a) 5 : 10 : 9
- b) 9 : 5 : 10
- c) 2 : 3 : 7
- d) 1 : 3 : 5

14) In a school pass to fail ratio of students being 11 : 5. If the number of students being 62 less than the ratio of fail to pass becomes 3:7. Find the pass students initially?

- a) 77
- b) 100
- c) 190
- d) 200

15) A completion between two shopkeepers each other during festivals session. Initial prices of their article was in the ratio of 5 : 8. If the price of article is increased by x% and 50% such that the new ratio of their product becomes 7 : 10. Find X?

- a) 68%
- b) 70%
- c) 65%
- d) 60%

16) A company has certain employees with the ratio of men to women is 7:8. Due to covid-19 pandemic, there is some lay-off in the company due to which ratio of working men to removed men becomes 5 : 2 while ratio of working women to removed women becomes 5:3. If the difference between working men to removed men is 150. Find total employees of the company.

- a) 750
- b) 570
- c) 500
- d) 400

17) Ratio of circumference of circle to the perimeter of rectangle is 11 : 3. Sum of length and breadth of rectangle is 6 cm. Find the circumference of circle?

- a) 44
- b) 48
- c) 52
- d) 28

18) The age of Amit is 3 times of Ramit and age of Ramit is 2 times of Sumit and Sumit is 10 years younger to Amit. Find the present age of Ramit?

- a) 4

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b) 6

c) 8

d) 2

19) A and B entered into partnership with ratio 3 : 5.

A invested his money for 15 months while B invested for 18 months .Find the total profit earned by both if the difference Between their profit is Rs. 1500

a) Rs. 6000

b) Rs. 4500

c) Rs. 3000

d) Rs. 4000

20) A sum of money Rs.400 divided among A,B,C in such a way that B gets Rs.40 more than A and C get 80 more than B .Then, ratio of their shares is

a) 2:5:3

b) 2:3:5

c) 3:2:5

d) 5:2:3

21) An office having $\frac{5}{9}$ of the male employees and the rest were female. $\frac{3}{8}$ of female were post-graduate and remaining were under graduates. Similarly $\frac{6}{25}$ of men were under graduates and remaining was PG. Find the total number of employees of the office? (Given Men who were under graduate 240)

a) 1800

b) 2000

c) 1700

d) 1500

22) Sumit has apples, oranges and banana in the ratio of 2 : 5 : 8.The number of oranges is more than apples by a number which is multiple of both 6 and 8. Find the minimum number of fruit in sumit's shop?

a) 120

b) 150

c) 90

d) 180

23) The ratio of Curved surface area of cylinder to the area of circle is 22 : 7. If the difference between height and radius is 4 cm then what is the volume of cylinder?

a) 1694 cm^3

b) 1532 cm^3

c) 1331 cm^3

d) 1428 cm^3

24) Two Container A and B, having two liquids water and alcohol. Container A contains mixture in the ratio of 3 : 4 while container B contains mixture in the ratio of 5 : 8. Both the container is having same alcohol concentration and mixture in B is 182L. Find water concentration in Container A?

a) 84

b) 96

c) 112

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d) 88

25) Sanket decided to row a boat between points A and B situated at 120 kms apart. While going upstream he takes 12 hrs and while going downstream he takes 10 hours. Find the speed of stream is what percentage of boat speed?

a) $9\frac{1}{11}\%$

b) $11\frac{1}{9}\%$

c) $13\frac{7}{9}\%$

d) 12.5%

26) To pass an examination 40 % marks are required. Amit scores 20% more than passing marks while Sumit scores 62.5% less than Amit. Find how much marks needs to be scored by Ramit more than the average of Sumit and Amit to score minimum marks?

a) 20 %

b) 21 %

c) 23 %

d) 25 %

27) Three friends namely Arun, Barak and Clara decided to start a venture with the ratio of investments being 3 : 5 : 3. After 6 months Arun and Barak double their investment while Clara left the business. Find the profit of Clara is how much percent less than that of Barak?

a) 80%

b) 75%

c) 60%

d) 50%

28) A school has the ratio of 8:5 (Boys : Girls) out of boys 60 % goes to picnic and 70% of Total student is the girls who go to trip. Find the percentage of student who doesn't goes to trip?

a) 44%

b) 47%

c) 50%

d) 43%

29) If the radius of the cylinder is increased by $11\frac{1}{9}\%$ and the height of the cylinder is decreased by $16\frac{2}{3}\%$ then find the percentage change in volume of cylinder?

a) 2.88%

b) 4.5%

c) 3.33%

d) 11.11%

30) Four years hence, sum of ages of A and B will be 16 years more than the sum of present age of B and C. Four years ago, Sum of ages of A and C is 32 years what is the present age of C?

a) 16

b) 20

c) 12

d) 15

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31) The ratio of third proportion to 12 and 30 and the mean proportion between 16 and 25 is?

- a) 15 : 4
- b) 25 : 4
- c) 50 : 51
- d) 25 : 26

32) If a Bag contains three color balls i.e red, blue and white in the ratio 3 : 4 : 5. If a man paints 3 white balls into red and then one red ball into blue, after this process number of blue balls becomes 15 in the bag then find the number of balls initially?

- a) 36
- b) 30
- c) 39
- d) 40

33) Age of Ravi is 200% more than Kavi. Age of Kavi is 150% of Lavi. If the average age of all Is 27 years. Find the age of Kavi before 3 years?

- a) 18
- b) 12
- c) 15
- d) 16

34) Ram and Shyam started a business with an initial investment of 3 : 5. After one year, Ram takes break from business while Raju joins with the investment double that of Ram. After second year they distributed their profit as per investment in which

difference of Ram and Raju is Rs. 4500. Find Initial investment of Raju (in rupees)?

- a) 9000
- b) 6000
- c) 10000
- d) 5000

35) Six years ago ratio of the ages of the two persons Pavi and Saravana was 3:2.Four years hence the ratio of their ages will be 8:7,what is Saravana age?

- a) 8
- b) 14
- c) 12
- d) 10

36) The ratio of speed of bus to car is 3 : 5. If the speed of the bus is increased by 25% then the Bus will take 4 hrs to travel 300km. Find the speed of the car?

- a) 75kmph
- b) 50kmph
- c) 100kmph
- d) 120 kmph

37) If the ratio of simple interest earned in two years to the principle is 3:10. Keeping the rate and time same find the ratio between principles to CI?

- a) 3225 : 10000
- b) 3225 : 1000
- c) 1225 : 1000
- d) 1331 : 1000

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38) A village has 7:9 ratio of population of female to male. If 45% of the population is married couple and 75% couple has one child then find the ratio of unmarried men to the couple having no child?

- a) 77 : 36
- b) 36 : 77
- c) Can't be determined
- d) 55 : 49

39) Two number's are in the ratio 3 : 5. If 2 is subtracted from each new number are in the ratio of 1 : 5. If 4 is added to the original number find the ratio of new number?

- a) 4 : 5
- b) 5 : 4
- c) 3 : 5
- d) 5 : 7

40) Three numbers are in the ratio of 1 : 2 : 3 and the sum of their squares is 126. Find the Smallest number?

- a) 1
- b) 2
- c) 3
- d) 4

41) A school has 2000 students. $\frac{1}{25}^{\text{th}}$ of the students didn't appear for the exams. $\frac{1}{100}^{\text{th}}$ of the total students were not allowed to write in exams due to application mismatching. If the difference between

pass and fail in the exam is 300 students. Find the number of students who were passed in the examination?

- a) 1100
- b) 1200
- c) 800
- d) 1000

42) If the ratio of the present age of A, B, C, D are 3 : 2 : 6 : 4 and the average of their age's after 5 years is 25 years. Find the sum of present age of B and C?

- a) 30 years
- b) 40 years
- c) 35 years
- d) 45 years

43) Anil brought a gold ring of 10gms in which concentration of impurity is 10%. After one year rust occurs which is 6% of the pure gold. Find the ratio of pure gold to the pure gold(except rest), after one year?

- a) 450 : 423
- b) 450 : 441
- c) 441 : 529
- d) None of these

44) Two person A and B ratio of their age's be 3:5. If after Three year's they have a brother and now the ratio becomes 5:8:2. Find the age of new born after 5 years?

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- a) 10 years
- b) 12 years
- c) Can't be determined
- d) None of these

45) A person markup his article by 20 % above CP and on selling he faces loss of 6.25%. Find the value of Markup price if the loss incurred was Rs. 19.

- a) Rs. 228
- b) Rs. 200
- c) Rs. 250
- d) Rs. 221

46) A container consists a mixture of water and milk in the ratio of 3 : 7 . After adding 12 litres of water ratio becomes 9 : 14 . Find initial value of water in the solution?

- a) 24 litres
- b) 30 litres
- c) 27 litres
- d) 24 litres

47) Three towns A, B and C having population in the ratio of 5:8:6. If 10% of the population in town A is not having Aadhar card, while town B and C have 94% and 70% of the population having aadhar card then find the ratio of people not having aadhar card?

- a) 25 : 24 : 90
- b) 25 : 24 : 180

- c) 24 : 25 : 80
- d) 30 : 39: 41

48) Three person A, B and C having income in the ratio 5:4:6.If the company gives increment to them by 10%,18% and 16% respectively. In the next year company given decrement of 16%, 18% and 10%.Find the ratio of their new income?

- a) 23100 : 19352 : 31320
- b) 31320 : 19352 : 23100
- c) Can't be determined
- d) None of these

49) Three numbers are in the ratio 3 : 4. If 5 is added to first number and 5 is subtracted from last number ratio becomes 4 : 5. Find the actual numbers?

- a) 135 and 180
- b) 135 and 150
- c) 180 and 150
- d) None of these

50) A bag contains 25 P coins 50 P coins and 1 rupee coins in the ratio 10: 5: 2, amounting to Rs. 224. Find the total number of coins in the bag.

- a) 544
- b) 464
- c) 272
- d) 232

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Ratio and Proportion – Answers and Explanation

1) Answer: A

Solution:

Let the two number's be $3x$ and $2x$.
According to the given question we will make equation.
$$\frac{(3x+2)}{(2x+4)} = \frac{3}{4}$$
$$12x + 8 = 6x + 12$$
$$12x - 6x = 12 - 8$$
$$6x = 4$$
$$x = \frac{2}{3}$$

So, the bigger number will be

$$3x = 3\left(\frac{2}{3}\right) = 2$$
$$2x = 2\left(\frac{2}{3}\right) = \frac{4}{3} = 1\frac{1}{3}$$

Hence the biggest number is 2

2) Answer: A

Solution:

Let the ratio of the present age of Ram and Shyam = $2 : 5$
.....(1)
Ratio of their age's after 3 years will be = $3 : 7$
.....(2)
As we know that difference between their age will always remains constant. So from eq(1)
We can see difference is 3 while from eq (2) we can see difference of 4. So we need to make them same so by multiplying eq (1) by 4 and eq (2) by 3.
Present age ratio become $8 : 20$

After 10 years ratio $9 : 21$
Now we can say that 1 unit = 3 years
Present age of Ram = $8 * 3 = 24$ years.
Aayam who is 10 years older, his present age will be 34 years.
So age of Aayam 5 years back will be 29 years.

3) Answer: C

Solution:

Given the ratio of Boy and Girl is $3 : 7$
Total students = 200
Boys = 60 and Girls = 140
So from above we can say that if there are 100 students then 70 will be girls and 30 will be boys.

	Girls	:	Boys
	140	:	60
Absent	42	:	6
Present	98	:	54

Hence the girls present in the class are 98.

4) Answer: A

Solution:

The ratio of CP and SP is $5 : 7$ ----- (1)
The ratio of MP and Discount is $20 : 6$ ----- (2)
So from eq (2) we can say that if MP is 20 and Discount is 6 then SP will be 14 but from eq (1) we can see that SP is 7.

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So now we need to balance this value.

We will multiply eq (1) by 2. So the new ratio we be as,

$$CP : SP : MP : D = 10 : 14 : 20 : 6 \text{ ----- (3)}$$

So the difference of SP and CP is profit which is of 4 units and this is equal to profit 100

$$4 \text{ unit} = 100$$

$$1 \text{ unit} = 25$$

$$SP = 14 \text{ units}$$

$$SP = 14 * 25 = 350$$

5) Answer: B

Solution:

$$\text{Ratio of speed of car to bus} = 5 : 3$$

Since bus covers 200km in 4 hrs then it's speed is 50 kmph.

$$\text{Car (5x)} \rightarrow 50 \text{ kmph}$$

$$\text{Bus (3x)} \rightarrow 30 \text{ kmph}$$

$$\text{Time} = \text{Distance} / \text{Speed}$$

$$\text{Time} = 270\text{km} / 30\text{kmph}$$

$$= 9 \text{ hours}$$

6) Answer: B

Solution:

Speed of three car's say C_1, C_2, C_3 are in the ratio of 2 : 4 : 5

As we know that if the distance is same then time ratio will be inversely proportional to that of speed.

So first we will take LCM of (2, 4, 5) = 20 units

This 20 units we be treated as a common distance.

So now we have speed of all three car's and distance.

So by dividing Distance by their speeds we will get time ratio's.

$$\text{Time ratio will be } 10 : 5 : 4$$

7) Answer: A

Solution:

$$\text{Profit percent} = 12.5\% = 1/8 \text{(1)}$$

So from this we can say that there is profit of 1 unit, CP of 8 units and SP = 9 units.

$$\text{Discount percent} = 16.66\% = 1/6 \text{(2)}$$

So from this we can say that MP = 6 units, Discount = 1 unit and SP 5 units

So again we have two value of SP, multiply eq (1) by 5 and eq (2) by 9

We get the ratios as follows-

$$CP : SP : MP : P : D = 40 : 45 : 54 : 5 : 9$$

So the difference between the MP and CP is 14 units which is equal to 70 value.

$$\text{So } 1 \text{ unit} = 5 \text{ value}$$

$$SP = 45 \text{ units} * 5 = 225/-$$

8) Answer: B

Solution:

Solution:

$$A : B = 8 : 7$$

Let x be the common multiplier then

$$A : B = 8x : 7x$$

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$$A = B + 21$$

$$8x = 7x + 21$$

$$X = 21$$

$$A + B = 8x + 7x = 15x$$

$$= 15(21) = 315$$

9) Answer: A

Solution:

A person has some rupee notes in his pockets of 10, 20, 50 in the ratio of 5 : 6 : 8.,

Let's find the total amount = $(10 \times 5 + 20 \times 6 + 50 \times 8) = 570$ units

This money will be distributed between two daughters as 3 : 2 (younger receives less)

$$2 \times 570 / 5 = 230 \text{ units}$$

$$\text{Elder receives} = 340 \text{ units}$$

$$\text{Given } 230 \text{ units} = 4600$$

$$\text{So } 1 \text{ unit} = 20$$

$$\text{So total } 570 \text{ units} = 570 \times 20 = \text{Rs. } 11,400$$

10) Answer: A

Solution:

So we will be taking ratio as given,

$$A : B = 6 : 5 \dots\dots\dots(1)$$

$$B : C = 3 : 2 \dots\dots\dots(2)$$

So again we will balance the ratio by multiplying eq (1) by 3 and eq (2) by 5 we get

$$A : B : C = 18 : 15 : 10$$

D will get 50% of $(A + C)$

So D will get 14 units.

Difference of B and D is 1 unit and this will be equal to 250

Hence income of A is 18 units, so actual value will be $18 \times 250 = 4500$

11) Answer: D

Solution:

So the initial quantity was 2 litre I.e 2000ml

Ratio of pure milk to water is 4 : 1

So we can see that milk will be 1600ml and water will be 400ml.

If he consumes only 1500ml of it then

Milk – 1200 ml; Water – 300 ml

12) Answer: B

Solution:

Initial distribution of his will between two son's = 2 : 3
...(1)

New distribution of his will between two son's = 3 : 5
.....(2)

So from eq (1) we can say that total property will be 5 units and that of from eq (2) will be of 8 units.

So we will take LCM $(5, 8) = 40$ units.

So initial ratio on the basis of 40 units will be 16 : 24

Final ratio on the basis of 40 units will be 15 : 25

So the reduction will be of 1 unit which is equal to 2 lakh.

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Hence the actual property which is 40 units will be $40 \times$

$$2 = 80 \text{ lakh}$$

13) Answer: A

Solution:

$$A/2 = B/3 = C/7 \text{ (Given)}$$

Taking two terms at a time and making ratio's we get,

$$A : B = 2 : 3$$

$$B : C = 3 : 7$$

So the ratio's become $A : B : C = 2 : 3 : 7$

To find, $(A + B) : (B + C) : (C + A)$, we will put value's in it as this will not affect the actual ratio because it is in ratio.

$$5 : 10 : 9$$

14) Answer: A

Solution:

Initial ratio of pass to fail $11 : 5$ (1)

Final ratio of final to pass $3 : 7$ (2)

This ratio is changed because 62 students less than becomes pass but we can see that there must be no change of fail. So we will balance fail unit in both equations.

New ratio(s)

$$\text{Initial } 77 : 35$$

$$\text{Final } 15 : 35$$

$$(77-15) \text{ units} = 62 \text{ value}$$

$$\text{So } 1 \text{ unit} = 1 \text{ value.}$$

So initial pass students will be 77 students.

15) Answer: A

Solution:

Initial prices of their article (A and B) was in the ratio 5 : 8.

Initial price of Product A = $5x$

Initial price of Product B = $8x$

After Increment the new prices will be

$$5x \times (100 + x)\% = 7$$

$$8x \times (150/100) = 10$$

$$\{5x(100+x)/100\} / \{8x(150/100)\} = 7 / 10$$

$$100+x=21 \times 8$$

On solving above equation

We will get $X = 68\%$

16) Answer: A

Solution:

Given the ratio of male to female is 7 : 8

Male : Female

$$7 : 8$$

Work : Remove Work : remove

$$5 : 2 \qquad \qquad \qquad 5 : 3$$

So the difference between working men and removed men will be of 3 units which is equal to 150.

Then 1 unit = 50 value

Total employees are 15 unit = $15 \times 50 = 750$ employees

17) Answer: A

Solution:

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Ratio of circumference of circle to perimeter of rectangle
= 11/3
 $(2\pi r) : \{2(l+b)\} = 11 : 3$
On solving above we get ,
 $l+b=6$
 $2\pi r/2*6=11/3$
 $22*r/7*6=11/3$
 $R=7$
Circumference of circle $=2\pi r=44$

18) Answer: A

Solution:

Ratio of age of Amit and Ramit is 3 : 1
.....eq (1)

Ratio of age of Ramit and Sumit is 2 : 1eq
(2)

So balancing Ramit age by multiplying eq (1) by 2 and
eq (2) by 1 we get ratio as

$Amit : Ramit : Sumit = 6 : 2 : 1$

Given is the difference of Amit and Sumit age which 10
years.

$So\ 5\ unit = 10\ years$

$1\ unit = 2\ years.$

$Present\ age\ of\ Ramit = 2 * 2 = 4\ years.$

19) Answer: B

Solution:

Ratio of investment of A and B = 3 : 5

Time Ratio of their investment = 15 : 18

Total investment = investment * time

Total investment of A and B = 1 : 2

Difference of their profit is 1 unit which is equal to
1500/- . So total profit is 3 units

Total profit = 4500

20) Answer: B

Solution:

Let share of A=x

Then B share=x+40

And C share=x+40+80=x+120

$A+B+C=400$

$X+x+40+x+120=400$

$3X=240$

$X=80$

Required ratio=80:120:200

$=2:3:5$

21) Answer: A

Solution:

Let's take the ratio of male to female = 50 : 40

Male		Female	
50	:	40	
UG	:	PG	UG : PG
12	:	28	25 : 15

Given is the boys who are graduate is 240.

Here from ratio, we can see that boys who are under
graduates are 12 units.

So we can say that 12 units = 240

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1 unit = 20

Total students = 90 units

Total students = $90 * 20 = 1800$

22) Answer: A

Solution:

The given ratio of apples, oranges and banana in the ratio of 2 : 5 : 8.

So the total fruits will be 15 units.

Difference between orange and apple is 3 units and this must be a multiple of 6 and 8 (minimum)

Taking LCM of (6, 8) we get 24 no's

So this 3 units will be equals to 24 no's

1 unit = 8 no's

Total fruits = $15 * 8 = 120$ fruits (minimum)

23) Answer: A

Solution:

The ratio of Curved surface area of cylinder to the area of circle is 22 : 7.

$$(2\pi rh) : (\pi r^2) = 22 / 7$$

$$h : r = 11 / 7$$

So the difference of h and r is 4 units which is equal to 4 cm.

So 1 unit = 1 cm

$$\text{Volume of cylinder} = \pi r^2 h = 22 * 11 * 7 * 7 / 7 = 1694 \text{ cm}^3$$

24) Answer: A

Solution:

Container A contains mixture in the ratio of 3 : 4.

Container B contains mixture in the ratio of 5 : 8.

Mixture in B is 182L

$$\text{Alcohol in Mixture B} = 8/13 * 182 = 112$$

Since it is given that both the container having is same alcohol concentration

$$\text{Alcohol concentration in Mixture A} = 112$$

Total Mixture in A is

$$4/7 * x = 112$$

$$\text{Mixture in A} = 196$$

$$\text{Water concentration in Container A} = 196 - 112 = 84$$

25) Answer: A

Solution:

$$\text{Distance AB} = 120 \text{ kms}$$

$$\text{Time taken in upstream} = 12 \text{ hours}$$

$$\text{Time taken in downstream} = 10 \text{ hours}$$

Since Distance is same so we can take ratio of time,

	$U_s : D_s$
Time	12 : 10
Speed	10 : 12

$$\text{Upstream} = 10x$$

$$\text{Downstream} = 12x$$

$$\text{Speed of boat} = (10x + 12x)/2 = 11x/2$$

$$\text{Current speed} = (12x - 10x)/2$$

$$= x/2$$

$$\text{Percentage} = \{(x/2) / (11x/2)\}$$

$$= 1 / 11$$

$$= 9(1/11)\%$$

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26) Answer B

Solution:

Minimum score to pass the exam = 40%

Amit score 20% more than passing marks = 48%

Sumit score 62.5% less marks than Amit = 18%

Ramit score average marks of Amit and Sumit = $(48 + 18) / 2$

Marks scored by Ramit = 33%

Now to score minimum passing marks Ramit needs to score 7% more marks on 33%

So the required percentage = $7 / 33$

Required marks = 21% (approx)

27) Answer: A

Solution:

	Arun	:	Barak	:	Clara
Investment	3	:	5	:	3
Time	6	:	6	:	6
After 6 months	6	:	10	:	
Left					
Time	6	:	6	:	6

After taking above ratio's into consideration, we will form total investment ratio's

Final ratio's 3 : 5 : 1

Since it is clearly seen that investment of C is 4 units less than B so ,

Percentage less profit = $4 / 5 * 100 = 80\%$

28) Answer: B

Solution:

Boys	:	Girls
8	:	13

60% boys goes to school trip = 60% of 8 = 4.8 boys

30% girls of total students goes to school trip = 6.3 girls

Boys who doesn't go to trip = 3.2

Girls who doesn't goes to trip = 6.7

Total students who doesn't goes to trip = 9.9

Percentage = $9.9 / 21 = 47\%$

29) Answer: A

Solution:

Volume of cylinder = $\pi r^2 h$

	Old	:	New
Radius	9	:	10
(Radius) ²	81	:	100
Height	6	:	5

Since from formula we can see that volume is independent of pi and radius varies with square while height varies directly.

Old volume = $81 * 6 = 486 \text{ unit}^3$

New volume = 500 unit^3

Change = 14 unit^3

Percentage change = $(14 / 486) * 100 = 2.88\%$

30) Answer: A

Solution:

Let the present age's are A, B and C

According to the first statement,

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$A + 4 + B + 4 = B + C + 16$
 $A - C = 8$ eq (1)
According to the second statement,
 $A - 4 + C - 4 = 32$
 $A + C = 40$eq (2)
On solving above equations we get $A = 24$ and $C = 16$ years.

31) Answer: A

Solution:

Third proportion is calculated as -
 $12 / 30 = 30 / X$
 $X = 75$
Mean proportion is calculated as –
Mean proportion= $\sqrt{16 \times 25}$
Mean proportion = 20
So the ratio between third proportion and mean proportion is 15 : 4

32) Answer: A

Solution:

Given ratio of balls is 3 : 4 : 5
Let's assume total balls are 12 units.
Step: 1. when three white balls are painted into red.
Red balls becomes 6 and white becomes 2, blue remains same.
Step: 2.
Now one red ball is painted into blue.
Such that the new ratio of balls becomes,

5 : 5 : 2
So the blue balls were 15 in number which is equal to 5 units
1 unit = 3 balls
12 units = 36 balls.

33) Answer: C

Solution:

Deducing the language into ratio's
 $R : K = 3 : 1$
 $K : L = 3 : 2$
Balancing the ratio's we get
 $R : K : L = 9 : 3 : 2$
Average age of all = 28 years
Sum = 84 years
14 units = 84 years
1 unit = 6 years
Present age of Kavi = 18 years
Age 3 years back = 15 years.

34) Answer: A

Solution:

	Ram	:	Shyam	:	Raju
Initial investment	3	:	5	:	6
Total time	12	:	24	:	12
Final investment	3	:	10	:	6

Difference in the investment of Ram and Raju is 3 units which is equal to 4500/-
So 1 unit = 1500/-
Investment of Raju was 6 units = 6 * 1500 = 9000/-

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35) Answer: D

Solution:

Six year ago saravana's age = $2x$

Six year ago pavi's age = $3x$

$$3x + 10 / 2x + 10 = 8/7$$

$$5x = 10$$

$$x = 2$$

Present Saravana age = $2x + 6 = 10$

36) Answer: C

Solution:

From question we can calculate speed of Bus = 75kmph

Now this 75kmph is not actual speed it is incremented speed by 25%.

$$\text{So actual speed} = 75 * 100 / 125$$

$$\text{Actual speed} = 60\text{kmph}$$

From ratio we can conclude if 3 unit = 60kmph so 5 unit = 100 kmph

37) Answer A

Solution:

Given is the ratio of principle to the S.I of two years - $10 : 3$

So Rate for two years can be calculated as $3 * 100 / 10 = 30\%$

Since we can say that Rate is 15% per year.

CI for two years on rate being 15% is calculated by successive as

$$15 + 15 + 15 * 15 / 100$$

CI for two years = 32.25%

Ratio of CI to principle $32.25 : 100$

$$3225 : 10000$$

38) Answer: A

Solution:

Male to female population ratio $7 : 9$

Unmarried male population will be 55% of 7.....(1)

Married couple who don't have any child will be 45% of 25% of 16.....(2)

Taking ratio's of eq (1) and eq (2)

$$(55 * 7 / 100) = (45 * 25 * 16) / (100 * 100)$$

Required ratio will be $77 : 36$

39) Answer: A

Solution:

Let the original number's be $3x$ and $5x$.

$$(3x - 2) / (5x - 2) = 1/5$$

On solving above we get $x = 4/5$

Such that number's will be $12/5$ and 4 .

Now if 4 is added to the original number. So we get $32/5$ and 8

Ratio of new number will be $= 32/5 : 8 = 4 : 5$

40) Answer: C

Solution:

Let the number in the ratio be $x, 2x, 3x$

Sum of their square's be $= 126$

$$x^2 + 4x^2 + 9x^2 = 126$$

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$$14x^2 = 126$$

$$X = 3$$

41) Answer: A

Solution:

Given total students = 2000

1/25 didn't appear for the exam = $1 \times 2000 / 25 = 80$

Eligible for the examination = 1920

1/100 not allowed to sit in examination = 20

Appeared for examination (Pass + fail) =
1900.....(1)

Difference of pass and fail = 300.....(2)

On solving both we get pass = 1100 and fail = 800

42) Answer: B

Solution:

Given the ratio of present age of A : B : C : D = 3 : 2 : 6 :
5

After 5 years average will become 25 years which means
sum will be 100 years.

Sum of their age in present = 80 years

16 units = 80 years

1 unit = 5 years

Present age of B = 10 and C = 30

Sum = 40 years.

43) Answer: A

Solution:

Given is total gold of 1000 mg or 10 gm

This consist of 10% impurity and rest is Pure gold such
900 mg is pure and 100 mg is impurity.

After 1 year there is rust on it's surface which is 6% of
pure gold I.e 54mg

Pure gold on 1st year = 900 mg

Pure Gold except rust on 2nd year 846 mg

Ratio = 450 : 423

44) Answer: C

Solution:

Let the present age of A and B be 3x and 5x.

After 3 years a new baby was born so the ratio becomes
5 : 8 : 2

Since from the above two equations we can conclude that
there is no actual value is given.

So we cannot find the actual value by any method hence
the answer will be cannot be determined.

45) Answer: A

Solution:

CP : MP = 5 : 6

CP : SP = 10 : 9

Balancing ratios we get CP : MP : SP = 10 : 12 : 9

Loss = 19 = 1 unit

Markup price = Rs. 228

46) Answer: A

Solution:

Initial ratio of water : milk = 3 : 7

After adding 12 l of water ratio becomes 9 : 14.

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Since we can see that only water is added.

So milk must remain same.

Hence we will balance milk by multiplying initial ratio with 2.

Initial mixture 6 : 14

Final mixture 9 : 14

So ratio difference is 3 which is equal to 12. So from here we can conclude 1 unit = 4 litre.

Initial water $6 \times 4 = 24L$

Alternative method

$$3x + 12/7x = 9/14$$

$$X = 8$$

$$\text{Initial water} = 3x = 3 \times 8 = 24L$$

47) Answer A

Solution:

Population in the ratio of 50 : 80 : 60

Having Aadhar 45 : 75.2 : 42

Not having Aadhar 5 : 4.8 : 18

Not having Aadhar 25 : 24 : 90

48) Answer A

Solution:

Let Income of person A, B, C are in the ratio 50 : 40 : 60

Increment to them by 10%, 18% and 16% respectively.

New Ratio of their income will be in the ratio 55 : 47.2 : 69.6

The above ratio can also be written as 550 : 472 : 696

Next year company Given decrement of 16%, 18% and 10%.

Final income of person's will be 462 : 387.04 : 626.4

This can also be written as 23100 : 19352 : 31320

49) Answer A

Solution:

Let the two numbers be 3 : 4

So according to the given condition,

$$(3x + 5)/(4x - 5) = 4/5$$

On solving above equation we get $x = 45$

So that the numbers will be 135 and 180

50) Answer: A

Solution:

Let ratio be x .

Hence no. of coins be $10x, 5x, 2x$ respectively

Now given total amount = Rs.224

$$\Rightarrow (10x)/4 + (5x)/2 + (2x) = 224$$

We get $x = 32$

$$\text{The total number of coins} = 10 \times 32 + 5 \times 32 + 2 \times 32 = 544$$

Time Speed and Distance

1) While covering the distance of 540 km, if the speed of Car is increased by 3 kmph then it takes 2 hours

less to cover the same distance then find the new speed of the car?

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a) 30 kmph

b) 40 kmph

c) 50 kmph

d) None of these

2) A man walks with the speed of 7 kmph then he reaches office 2 minutes before the actual time but if he travels with 5 kmph then he reaches 2 minutes late then what is the actual time to reach office?

a) 9 mins

b) 12 mins

c) 10 mins

d) 8 mins

3) If a cycle can cover 75 kms in 15 hours while a bike can cover 80 km in 5 hours then find their average speed?

a) 7 kmph

b) 7.75 kmph

c) 6.65 kmph

d) None of these

4) If the speed of bus and car is in the ratio of 1 : 4 and time taken by bus was 6 hours more than car. The distance travelled by them was 80 km each then find the speed of bus?

a) 5 kmph

b) 8 kmph

c) 10 kmph

d) 12 kmph

5) If the ratio of time taken by Ajay and Vijay is 3 : 2 and the distance travelled by Ajay was five time to that of Vijay then find the ratio of their speeds?

a) 3 : 10

b) 1 : 30

c) 3 : 13

d) 10 : 3

6) If a car covers a distance of 120 kms with (S) speed in (T) speed if the same car covers thrice the distance in (T - 4) time with six times the initial speed then find the value of time (T)?

a) 8 hours

b) 6 hours

c) 4 hours

d) 20 hours

7) If the ratio between the time taken by Karan to Ayush's car is 4 : 1 but the distance covered by Ayush was 250% to that of Karan then find the speed ratio of Ayush to Karan?

a) 3 : 10

b) 10 : 3

c) 10 : 1

d) 1 : 10

8) If the speed of Truck is 30% less than that of Bus and their average speed is 35 kmph then find the speed of Truck? Given that both travelled same distance.

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a) 59.5 kmph

b) 60 kmph

c) 31.5 kmph

d) 25.7 kmph

9) If the speed ratio of P, Q and R while covering the same distance is 5 : 2 : 1 then find the ratio of time taken by them?

a) 2 : 15 : 1

b) 2 : 5 : 1

c) 2 : 1 : 10

d) 2 : 5 : 10

10) If the time ratio of Arnab, kamal and Raju is 2 : 5 : 4 then find the speed ratio to cover the distance of 4 : 3 : 7 respectively?

a) 2 : 1 : 5

b) 40 : 12 : 35

c) 10 : 12 : 31

d) 21 : 10 : 35

11) If Gopal walks at the speed of 10 kmph instead of 7 kmph then he must have travelled 30 kms more in the same time then find the distance travelled by Gopal with the speed of 7 kmph?

a) 50 kms

b) 60 kms

c) 70 kms

d) 80 kms

12) While covering the distance of 540 kms, Car A takes 6 hours more than Car B and the ratio of their speed is 3 : 5 then find speed of Car B?

a) 80 kmph

b) 60 kmph

c) 50 kmph

d) 70 kmph

13) If the time taken by Train is 250% of the time taken by Truck and travelled with 6 kmph less to that of Truck to cover the distance of 360 kms then find the time taken by the Truck?

a) 14 hours

b) 20 hours

c) 28 hours

d) 24 hours

14) If the ratio of speed of Ajit and Barkha is 2 : 3 and the time taken by Barkha is 6 minutes less than Ajit to complete the distance of 18 kms then find the speed of Ajit?

a) 30 kmph

b) 45 kmph

c) 60 kmph

d) 50 kmph

15) If the speed of cycle is decreased by 25 kmph then it takes 5 hours more to cover the distance of 880 kms then find the new speed of Cycle?

a) 50 kmph

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b) 40 kmph

c) 65 kmph

d) 55 kmph

16) If a ship runs with 80% of its initial speed then it takes 10 minutes more to cover the distance of 480 kms then find its initial speed?

a) 240 kmph

b) 480 kmph

c) 720 kmph

d) 360 kmph

17) If the actual time taken by Tanu is $2\frac{2}{3}$ times to that of Manu to cover the distance of 120 km then find the speed of Manu?

a) 20 kmph

b) 40 kmph

c) 50 kmph

d) 30 kmph

18) Naval starts walking with the speed of 3 kmph for 3.5 hours and then 5.5 kmph for 3 hours then find the average speed of Naval during the whole journey?

a) 3.5 kmph

b) 7.15 kmph

c) 4.15 kmph

d) 6.35 kmph

19) If the speed of bus is 45 kmph and its speed is increasing by 10% after each hour then find how much distance it will cover in 3 hours?

a) 140.95 kms

b) 145.95 kms

c) 148.95 kms

d) 150.95 kms

20) If the time taken by A is 50% to that of B who takes twice the time of C to cover the same distance then find their speed ratios respectively?

a) 1 : 2 : 1

b) 2 : 2 : 1

c) 1 : 1 : 2

d) 2 : 1 : 2

21) While covering the distance of 360 kms, Car takes five hours less than bus and the ratio of their speed is 4 : 3 then find speed of Car?

a) 24 kmph

b) 25 kmph

c) 28 kmph

d) 20 kmph

22) If the actual speed of a Car is 45 kmph but due to traffic driver drove his car at 36 kmph and takes 2 hours more to cover whole journey the find the total distance?

a) 360 kms

b) 450 kms

c) 180 kms

d) 330 kms

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23) If Sumit travelled with the speed $2/5^{\text{th}}$ of his actual speed then he takes to cover 15 minutes more a distance of 50 kms then find his actual speed?

- a) 300 kmph
- b) 100 kmph
- c) 280 kmph
- d) 350 kmph

24) If the distance covered by Priya is thrice to that of Tarun and their speed ratio is 2 : 5 then find their time ratio?

- a) 3 : 15
- b) 2 : 15
- c) 15 : 2
- d) 15 : 7

25) Two bikes running with the speed of 10 kmph and 12 kmph towards each other then find after how many hours they will meet when covering the distance of 396 kmph?

- a) 10 hours
- b) 18 hours
- c) 16 hours
- d) 17 hours

26) If the actual speed of Truck is 36 kmph but due to overloading its speed fall by 9 kmph due to which truck takes 2 hours more then find the distance covered in overloading case?

- a) 256 kms

b) 216 kms

c) 108 kms

d) 290 km

27) If the speed of car is decreased by 2 kmph then it takes 2 hours more to cover the distance of 120 kms then what will be the new speed of car?

- a) 8 kmph
- b) 12 kmph
- c) 10 kmph
- d) 15 kmph

28) A train having speed 20% more than bus while covering the distance of 120 kms each train takes 30 minutes less than bus then find the speed of bus?

- a) 20 kmph
- b) 40 kmph
- c) 60 kmph
- d) 50 kmph

29) If the time taken by Train and Truck to cover 80% of Distance and 140% of distance is same then find the ratio of speed of Train to Truck?

- a) 7 : 4
- b) 4 : 7
- c) 3 : 2
- d) 2 : 3

30) If the new speed of car is $6/7^{\text{th}}$ of itself then it takes 3 hours more to cover 270 kms then find the actual speed?

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a) 18 kmph

b) 15 kmph

c) 21 kmph

d) 20 kmph

31) Arjun drive his car at 20 kmph then he reaches his office 5 minutes earlier and if he drive his car with 16 kmph then he reaches his office 5 minutes late then find at actual time to reach office?

a) 15 minutes

b) 35 minutes

c) 40 minutes

d) 45 minutes

32) If the speed of Car is decreased by 37.5% then it takes 6 hours more to cover a distance of 180 kms them find its initial Speed?

a) 12 kmph

b) 15 kmph

c) 18 kmph

d) 21 kmph

33) Sumit takes 2 hours less time to cover the distance of 160 kmph when he increases his speed by 4 kmph then find the time taken to cover the distance?

a) 10 hours

b) 12 hours

c) 9 hours

d) 13 hours

34) Rama when increases his speed to 5 kmph took 2 hours less to cover the distance of 120 kmph then find the initial speed of Rama?

a) 10 kmph

b) 18 kmph

c) 15 kmph

d) 16 kmph

35) If the speed of car is five times to that of Bus and takes 16 minutes less than Bus to cover the distance of 60 kms then find the speed of car?

a) 100 kmph

b) 90 kmph

c) 900 kmph

d) 180 kmph

36) Tina wants to cover 150 kms with a certain speed if she reduces her speed by 5 kmph then she takes 5 hours more than before then find her new speed?

a) 10 kmph

b) 12 kmph

c) 15 kmph

d) 20 kmph

37) Ravi who can cover a certain distance in 6 hours travelled with the speed 15 kmph more than Rahul who also travelled the same distance then find the speed of Rahul?

a) 36 kmph

b) 30 kmph

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c) Cannot be determined

d) None of these

38) If the speed ratio of Car and Truck is 5 : 1 and the time taken by Truck is 4 hours more to that of car to cover the distance of 120 kms then find the time taken by the truck to cover 96 kms of distance?

a) 4 hours

b) 8 hours

c) 6 hours

d) 12 hours

39) If the speed of car is 62.5% of bus whose speed is 80% of bike to cover the same distance then find their time ratio respectively?

a) 8 : 5 : 4

b) 5 : 8 : 10

c) 5 : 8 : 4

d) 1 : 5 : 7

40) If the time taken by A is 33.3% of C who takes 60% to that of B to cover the same distance then what will be their speed ratios respectively?

a) 1 : 3 : 5

b) 15 : 5 : 3

c) 5 : 1 : 3

d) 15 : 5 : 1

41) If the distance travelled by P is 300% of Q who travelled 400% of R in the same time then find the ratio of their speeds?

a) 2 : 4 : 1

b) 2 : 4 : 1

c) 3 : 4 : 1

d) 12 : 4 : 1

42) If the time(t) taken to cover the distance of 196 kms is 25% to that of speed(S) then find the time taken to cover the same distance with half of the speed?

a) 10 hours

b) 14 hours

c) 12 hours

d) 16 hours

43) If the time(t) taken to cover the distance of 160 kms is 10% to that of speed(S) then find the time taken to cover the same distance with (S - 5) kmph?

a) 5.5 hours

b) 4.5 hours

c) 6.5 hours

d) None of these

44) If the difference between the speed of Train and Truck is 20 kmph to cover the same distance of 150 km and the time taken by truck and Train was 4 hours and 3 hours respectively then find the speed of Train?

a) 80 kmph

b) 40 kmph

c) 20 kmph

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d) 30 kmph

45) If the sum of speed of Car and Truck is 40 kmph to cover the same distance of 180 km and the time taken by truck and car was 5 hours and 3 hours respectively then find the speed of Truck?

a) 20 kmph

b) 05 kmph

c) 15 kmph

d) 25 kmph

46) If the speed of Car , Truck and Bus is in the ratio of 3 : 1 : 2 to cover the same distance of 60 kms, bus takes 6 hours then find the speed of Car?

a) 25 kmph

b) 35 kmph

c) 15 kmph

d) 10 kmph

47) If the speed of C, A and B is in the ratio of 4 : 2 : 3 to cover the same distance of 96 kms A takes 6 hours then find the speed of C?

a) 32 kmph

b) 33 kmph

c) 34 kmph

d) 30 kmph

48) If the speed of P is 50% of Q and takes 4 hours more than Q to cover the distance of 120 kms then find the average speed of P and Q?

a) 10 kmph

b) 40 kmph

c) 30 kmph

d) 20 kmph

49) If the time taken by A is 200% of B and travelled with 12 kmph less to that of B to cover the distance of 240 kms then find the speed of A?

a) 16 kmph

b) 10 kmph

c) 12 kmph

d) 15 kmph

50) If the time taken by A is 2 hours less than B while travelling the same distance of 120 kms then find the speed of A if speed of B is 10 kmph?

a) 12 kmph

b) 10 kmph

c) 15 kmph

d) 11 kmph

Time Speed and Distance – Answers and Explanation

1) Answer: A

Solution: According to the question,

Let initial speed = S kmph and time taken to cover the given distance = T

First case:

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$$S = 540/T \dots\dots\dots(1)$$

Second case:

$$S + 3 = 540/T - 2 \dots\dots\dots(2)$$

Solving eq (1) and eq (2)

We get,

$$\text{Speed} = 27 \text{ kmph}$$

$$\text{New speed} = 27 + 3 = 30 \text{ kmph}$$

2) Answer: B

According to the question,

	Initial	New
Speed	7	5
Time	5x	7x

$$\text{Difference} = 2x$$

$$2x = 4 \text{ minutes}$$

$$x = 2 \text{ minutes}$$

$$\text{Initial time} = 10 \text{ minutes}$$

$$\text{New time} = 14 \text{ minutes}$$

$$\text{Actual time} = 10 + 2 = 12 \text{ minutes}$$

3) Answer: B

Solution:

According to the condition,

$$\text{Average speed} = (\text{Total distance})/(\text{Total Time})$$

$$\text{Average speed} = (75 + 80)/(15 + 5) = 7.75 \text{ kmph.}$$

$$\text{Average speed} = 7.75 \text{ kmph}$$

4) Answer: C

According to the question,

When distance is same; Speed \propto 1/Time

$$S_B : S_C = 1 : 4 \dots\dots\dots(1)$$

$$\text{Time taken ratio} = 4x : 1x \dots\dots\dots(2)$$

$$\text{Difference} = 3x$$

$$\text{Actual difference} = 6 \text{ hours}$$

$$3x = 6 \text{ hours}$$

$$4x = 8 \text{ hours}$$

$$\text{Speed of Bus} = 80/8 = 10 \text{ kmph}$$

5) Answer: D

Solution:

We know that

$$\text{Speed} = \text{Distance}/\text{Time} \dots\dots\dots(1)$$

Let S_A and S_V be the speed of Ajay and Vijay.

$$S_A = 5D/3x \dots\dots\dots(2)$$

$$S_V = D/2x \dots\dots\dots(3)$$

Ratio of speeds of Ajay and Vijay

$$S_A : S_V = 10 : 3$$

6) Answer: A

Solution: According to the question.

$$\text{Speed} = \text{Distance} / \text{Time} \dots\dots\dots(1)$$

First case:

$$S = 120/T \dots\dots\dots(2)$$

Second case:

$$6S = 3 \times 120/T - 4 \dots\dots\dots(3)$$

From eq (2) and eq (3)

On solving:

$$T = 8 \text{ hours}$$

$$S = 15 \text{ kmph}$$

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7) Answer: C

According to the question,

Time taken by Ayush : Karan = $1t : 4t$ (1)

We know that

Speed = Distance/Time(2)

Distance travelled by Ayush : Karan = $5d : 2d$
.....(3)

Speed of Ayush = $S_A = 5d/1t$ (4)

Speed of Karan = $S_K = 2d/4t$ (5)

Taking ratios,

$S_A : S_K = 10 : 1$

8) Answer: A

According to the question,

Speed of Truck to Bus = $7s : 10s$ (1)

Average speed = $2 \times x \times y/(x + y)$ (2)

$35 = 2 \times 7s \times 10s / 17s$

$s = 8.5$

Speed of Truck = $7s = 59.5$ kmph

9) Answer: D

According to the question,

Speed ratio of P, Q and R = $5 : 2 : 1$ (1)

Let distance = 10 units.

When distance is same,

Speed $\propto 1/\text{Time}$ (2)

Time ratio of P, Q and R = $2 : 5 : 10$

10) Answer: B

According to the question,

Time ratio of A, K and R = $2t : 5t : 4t$ (1)

Distance ratio of A, K and R = $4d : 3d : 7d$
.....(2)

Speed of Arnab = $S_A = 2d/t$

Speed of Kamal = $S_K = 3d/5t$

Speed of Raju = $S_R = 7d/4t$

$S_A : S_K : S_R = 40 : 12 : 35$

11) Answer: C

According to the question,

Initial Speed = 7 kmph

New speed = 10 kmph

From observation, if time = 10 hours

Then initial distance = $7 \times 10 = 70$ kms

Final distance = $10 \times 10 = 100$ kms

Difference = 30 kms (verified)

So, Time = 10 hours

Distance travelled = $10 \times 7 = 70$ kms

12) Answer: B

According to the question,

Speed ratio of A and B = $3 : 5$ (1)

Time ratio of A and B = $5t : 3t$ (2)

Difference = $2t$

$2t = 6$ hours

$1t = 3$ hours

Time taken by Car B = 9 hours

Speed of Car B = $540/9 = 60$ kmph

13) Answer: D

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Solution: According to the question.

	Train	:	Truck
Time	5	:	2
Speed	2x	:	5x

Difference = 3x
Actual difference = 6 kmph
3x = 6 kmph
1x = 3 kmph
Speed of truck = 5x = 15 kmph
Time taken by Truck = 360/15 = 24 hours.

14) Answer: C

According to the question,

	A	:	B
Speed	2	:	3
Time	3t	:	2t

Time difference = 1t
1t = 6 minutes
Time taken by Ajit = 3 × 6 = 18 minutes
18 minutes = 3/10 hours
Speed of Ajit = Distance Travelled by Ajit/Time taken by Ajit
Speed of Ajit = 18 × 10/3
Speed of Ajit = 60 kmph

15) Answer: D

According to the question,
Let the initial speed = S kmph
Initial time = t hours

S = 880/t.....(1)
New speed = S - 25 kmph
New time = t + 5 hours
S - 25 = 880/t + 5(2)
On solving eq (1) and eq (2)
We get, S = 80 kmph.
Time = 11 hours
New speed = 80 - 25 = 55 kmph

16) Answer: C

According to the question,

	Initial	:	New
Time	4t	:	5t
Speed	5	:	4

Difference = 1t
1t = 10 minutes = 1/6 hours
Initial timing = 40 minutes or 2/3 hours
Distance = 480 kms
Initial speed = 480 × 3/2
Speed = 720 kmph

17) Answer: B

According to the question,

	Manu	:	Tanu
Time	3	:	8

We know that
When distance is same; Speed α 1/Time(1)
Actual time taken by Manu = 3 hours
Speed = Distance travelled / Time(2)

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Speed of Manu = $120/3 = 40$ kmph

18) Answer: C

According to the condition,

Time taken in first part = 3.5 hours

Distance travelled in first part = $3.5 \times 3 = 10.5$ kms

Time taken in second part = 3 hours

Distance travelled in second part = $5.5 \times 3 = 16.5$ kms

Average speed = (Total distance)/(Total Time)

Average speed = $27/6.5 = 4.15$ kmph

19) Answer: C

According to the question,

Speed of Train in 1st hour = 45 kmph(1)

After every hour speed = + 10%

Speed in 2nd hour = $(110/100) \times 45 = 49.5$ kmph
.....(2)

Speed in 3rd hour = $(110/100) \times 49.5 = 54.45$ kmph
.....(3)

Adding all,

Total distance = 148.95 kms

20) Answer: D

According to the question,

Time ratio of A & B = 1 : 2.....(1)

Time ratio of C & B = 1 : 2.....(2)

Time ratio of A : B : C = 1 : 2 : 1(3)

Since Distance is same

Let distance = 2 kms

Sped ratio of A : B : C = 2 : 1 : 2

21) Answer: A

According to the question,

Speed ratio of C and B = 4 : 3(1)

Time ratio of C and B = 3t : 4t(2)

Difference = 1t

1t = 5 hours

Time taken by Car = 15 hours

Speed of Car = 360/15

Speed of Car = 24 kmph

22) Answer: A

According to the question,

	Actual		Reduced
Speed	45	:	36
Time	4t	:	5t

Difference = 1t

Actual difference = 2 hours

1t = 2 hours

Actual time = 8 hours

Distance = Speed \times Time

Distance = 45×8

Distance = 360 kms

23) Answer: A

According to the question,

	Actual		New
Speed	5	:	2
Time	2t	:	5t

Difference = 3t

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$3t = 15$ minutes
 $1t = 5$ minutes
Actual time = 10 minutes
Speed = Distance/Time
Speed = $(50 \times 6)/1$
Speed = 300 kmph

24) Answer: C
According to the question,

	Priya		Tarun
Speed	$2x$:	$5x$
Distance	$3y$:	y
Time = Distance / Speed(1)		
Time _P	$= 3y/2x$(2)	
Time _T	$= y/5x$(2)	

Taking ratio,
Time ratio = 15 : 2

25) Answer: B
According to the question,
Sum of their speeds = Distance covered/Time taken
.....(1)
 $(10 + 12) = 396/\text{Time taken}$
Time taken = 18 hours
Hence, they will meet after 18 hours

26) Answer: B
According to the question,

	Normal		overloading
Speed	36	:	27

Time $3t$: $4t$
Difference = $1t$
 $1t = 2$ hours
Time taken in overloading = 8 hours
Distance = Speed \times Time
Distance = 27×8
Distance = 216 kms

27) Answer: C
According to the question,
Let the initial speed = S kmph
Initial time = t hours
 $S = 120/t$(1)
New speed = $S - 2$ kmph
New time = $t + 2$ hours
 $S - 2 = 120/t + 2$ (2)
On solving eq (1) and eq (2)
We get $S = 12$ kmph
Time = 10 hours
New speed of Car = $12 - 2 = 10$ kmph

28) Answer: B
According to the question,

	Bus		Train
Speed	5	:	6
Time	$6t$:	$5t$
Difference	$= 1t$		
$1t = 1/2$	hours		
Time taken by Bus	$= 3$ hours		

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Distance = 120 kms
Speed = Distance/Time
Speed = 120/3 = 40 kmph

29) Answer: B

According to the question,
Let the actual distance = D kms.

A			B	
Distance	80% of D	:	140% of D	
Distance	4D	:	7D	
Time	1	:	1	
Speed = Distance / Time(1)				
$S_A : S_B = 4 : 7$				

30) Answer: B

According to the condition,

	Actual	:	New
Speed	7	:	6
Time	6t	:	7t

Difference = 1t
1t = 3 hours
6t = 18 hours
Distance = Speed × Time(1)
Distance = 270 kms
Speed = 270/18
Speed = 15 kmph

31) Answer: D

According to the question,

Earlier	:	later
---------	---	-------

Speed	20	:	16
Time	4t	:	5t

Difference = 1t
1t = 10 minutes
Earlier = 40 minutes
Actual time = 40 + 5 = 45 minutes

32) Answer: C

			New	
			Initial	
Speed	8s	:	5s	
Time	5t	:	8t	

Difference = 3t
3t = 6 hours
1t = 2 hours
Initial Timing = 10 hours
Distance = 180 kms

Speed = 180/10
Speed = 18 kmph

33) Answer: A

According to the question,
Let the initial speed = S kmph
Let the initial time = T hours
 $S = 160/T$ (1)
 $S + 4 = 160/(T - 2)$ (2)
From eq(1) and eq(2)
S = 16 kmph
T = 10 hours

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34) Answer: C

According to the question,

Let the initial speed = S kmph

Let the initial time = T hours

$S = 120/T \dots\dots\dots(1)$

$S + 5 = 120/(T - 2) \dots\dots\dots(2)$

From eq(1) and eq(2)

$S = 15 \text{ kmph}$

$T = 8 \text{ hours}$

Initial speed = 15 kmph

35) Answer: C

According to the question,

	Car		Bus
Speed	5	:	1
Time	1t	:	5t

Difference = 4t

$4t = 16 \text{ minutes}$

$1t = 4 \text{ minutes}$

Initial Timing = 4 minutes

Distance = 60 kms

$\text{Speed} = (60 \times 15)/1$

$\text{Speed} = 900 \text{ kmph}$

36) Answer: A

Let the initial speed = S kmph

Let the initial time = T hours

$S = 150/T \dots\dots\dots(1)$

$S - 5 = 150/(T+5) \dots\dots\dots(2)$

From eq(1) and eq(2)

$S = 15 \text{ kmph}$

$T = 10 \text{ hours}$

$\text{New speed} = 15 - 5 = 10 \text{ kmph}$

37) Answer: C

Let the speed of Rahul = S kmph

Speed of Ravi = (S + 15) kmph

Time taken by Ravi = 6 hours

Time taken by Rahul = T hours

Distance is same,

$S = D / T \dots\dots\dots(1)$

$S + 15 = D / 6 \dots\dots\dots(2)$

From eq(1) and eq(2)

We can conclude that we have two equations and three variables. Hence the answer is cannot be determined.

38) Answer: A

	Car		Truck
Speed	5	:	1
Time	1t	:	5t

Difference of their speed = 4t

Difference = 4 hours

$1t = 1 \text{ hours}$

Time taken by the Truck = 5 hours

Speed of Truck = $120/5 = 24 \text{ kmph}$

Time taken to cover 96 kms = $96/24$

Time taken = 4 hours

39) Answer: A

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When time is same then Speed $\propto 1/\text{Time}$

Let the total Distance = 40 kms.

	Car	:	Bus	:	Bike
Speed	5	:	8	:	10
Time	8	:	5	:	4

Car : Bus : Bike = 8 : 5 : 4

40) Answer: B

When Distance is same then Speed $\propto 1/\text{Time}$,

Let the Distance = 15 kms

	A	:	B	:	C
Time	1	:	3	:	5
Speed	15	:	5	:	3

A : B : C = 15 : 5 : 3

41) Answer: D

When time is same then Speed \propto Distance

	P	:	Q	:	R
Distance	12	:	4	:	1
Speed	12	:	4	:	1

P : Q : R = 12 : 4 : 1

42) Answer: B

Speed = Distance Travelled / Time taken(1)

Speed : Time = 4x : 1x.....(2)

4x X 1x = 196

x = 7

Speed of Train = 4x = S = 28 kmph

New speed = 28/2 = 14 kmph.

Time = 196/14

Time taken = 14 hours.

43) Answer: B

Speed = Distance Travelled / Time taken(1)

Speed : Time = 10x : 1x.....(2)

10x X 1x = 160

x = 4

Speed of Train = 10x = S = 40 kmph

New speed = 40 - 5 = 35 kmph.

Time = 160/35

Time taken = 4.5 hours.

44) Answer: A

	Train	:	Truck
Time	3	:	4
Speed	4s	:	3s

Difference of their speed = 20 kmph

Difference = 1s

1s = 20 kmph

Speed of Train = 4s = 80 kmph

45) Answer: D

	Car	:	Truck
Time	5	:	3
Speed	3s	:	5s

Sum of their speed = 40 kmph

Sum = 8s

8s = 40 kmph

s = 5 kmph

Speed of Truck = 5s = 25 kmph

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46) Answer: C

Common Distance = 60 kms

	C	:	T	:	B
Speed	3	:	1	:	2
Time	2t	:	6t	:	3t

3t = 6 hours
1t = 2 hours

So, time taken by Car = 4 hours

Speed of Car = 60/4 = 15 kmph

47) Answer: A

Common Distance = 96 kms.

	A	:	B	:	C
Speed	2	:	3	:	4

Since Distance = 96 kms.

Time	6t	:	4t	:	3t
------	----	---	----	---	----

6t = 6 hours
3t = 3 hours.

So, time taken by C = 3 hours.

Speed of C = 96/3 = 32 kmph.

48) Answer: D

	P		Q
Speed	1	:	2
Time	2t	:	1t

Difference = 1t

Actual difference = 4 hours

1t = 4 hours

Time taken by P = 8 hours

Time taken by Q = 4 hours

Average speed = (Total Distance)/Total time

Average speed = 240/12

Average speed = 20 kmph

49) Answer: C

	A		B
Time	2	:	1
Speed	1x	:	2x

Difference = 1x

Actual difference = 12 kmph

1x = 12 kmph

Speed of A = 12 kmph

50) Answer: A

Speed = Distance / Time(1)

For B:

Let T_B = Time taken by B

10 = 120/T_B

T_B = 12 hours

For A:

Time taken by A = 10 hours

S_A = 120/10

S_A = 12 kmph.

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Time and Work

1) A can do a piece of work in 25 days and B can do same work in 50 days. In how many days will A and B does this work together?

- a) 75
- b) 25
- c) $50/3$
- d) $100/3$

2) A and B can do a piece of work in 25 days and B can do same work in 50 days. In how many days will A alone can do the same piece of work?

- a) 50
- b) 75
- c) 25
- d) 100

3) If A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days will A, B and C will do this work together

- a) 10
- b) 15
- c) 18
- d) 12

4) A can do a piece of work in 25 days and B can destroy the same work in 50 days. In how many days will A and B complete the work together

- a) 25

b) 75

c) 50

d) 10

5) A and B can do a piece of work in 12 days and A can do same work in 30 days. In how many days B alone can do the 40% of same piece of work?

- a) 8 days
- b) 6 days
- c) 12 days
- d) 18 days

6) If A, B and C can do a piece of work in 40, 20 and 120 days respectively. In how many days will A, B and C will do $2/3^{\text{rd}}$ this work together

- b) 15 days
- a) 8 days
- c) 24 days
- d) 10 days

7) A can do a piece of work in 25 days and B can do same work in 50 days. A started the work alone but after 3 days he left the job. In how many days B will complete the rest of the work

- a) 31
- b) 41
- c) 44
- d) 40

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8) A can do a piece of work in 45 days and B can do same work in 15 days. B started the work alone but after 5 days he left the job. In how many days A will complete the rest of the work

- a) 45 days
- b) 30 days
- c) 25 days
- d) $41\frac{1}{3}$ days

9) A can do a piece of work in 60 days and B can do same work in 30 days. They started the work together but after 3 days A left the job. In how many days B will complete the rest of the work

- a) 25 days
- b) $25\frac{1}{2}$ days
- c) 51 days
- d) 12 days

10) A can do a piece of work in 18 days and B can do same work in 27 days. They started the work together but after 5 days B left the job. In how many days A will complete the rest of the work

- a) $11\frac{1}{3}$ days
- b) $9\frac{2}{3}$ days
- c) 12 days
- d) 15 days

11) A can do a piece of work in 120 days and B can do same work in 180 days. They started the work together but after completion of 75% of work, A left

the job. In how many days B will complete the rest of the work

- a) 30 days
- b) 45 days
- c) 60 days
- d) None of these

12) A can do a piece of work in 20 days and B can do same work in 30 days. They started the work together but after 9 days A left the job. In how many days B will complete the rest of the work

- a) $7\frac{1}{2}$ days
- b) $12\frac{1}{2}$ days
- c) 15 days
- d) 20 days

13) A can do a piece of work in 18 days and B can do same work in 45 days. They started the work together but before 5 days of completion of work A left the job. Find the number of days in which B worked

- a) 27 days
- b) $11\frac{3}{7}$ days
- c) 54 days
- d) 30 days

14) A can do a piece of work in 54 days and B can do same work in 72 days. They started the work together but before 10 days of completion of work B left the job. Find the number of days in which A worked

- a) 175 days

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b) $25 \frac{1}{7}$ days

c) 25 days

d) None of these

15) A and B together can complete a piece of work in 10 days, B and C together can complete a piece of work in 15 days, C and A together can complete a piece of work in 20 days. In how many days will A, B and C together complete the work

a) 20 days

b) $60/13$ days

c) $120/13$ days

d) 24 days

16) A and B together can complete a piece of work in 72 days, B and C together can complete a piece of work in 36 days, C and A together can complete a piece of work in 54 days. In how many days will A, B and C together complete the 50% of work

a) $16 \frac{8}{13}$ days

b) 16 days

c) 24 days

d) None of these

17) A can do $\frac{2}{3}$ rd of work in 10 days while B can do $\frac{1}{5}$ th of work in 3 days. In how many days will they complete this work together?

a) 15

b) 9

c) $7 \frac{1}{2}$ days

d) 32

18) A can do $\frac{1}{3}$ rd of work in 15 days while B can do $\frac{1}{4}$ th of work in 15 days. In how many days will they complete the 60% this work together

a) 15 days

b) 13 days

c) $15 \frac{3}{7}$ days

d) 4

19) A can do a piece of work in 20 days and B can do the same work in 15 days. They started the work together but after few days B left the job. A completed the rest of the work in 8 days. Find the number of days in which B worked

a) $5 \frac{1}{7}$ days

b) 7 days

c) 5 days

d) 6 days

20) A can do a piece of work in 180 days and B can do the same work in 240 days. They started the work together but after few days A left the job. B completed the rest of the work in 40 days. Find the number of days in which A worked

a) $600/7$ days

b) $300/7$ days

c) 25 days

d) 35 days

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21) If A and B takes 18 and 32 days more to complete the work than (A +B) together. Find the number of days in which A and B together can complete the same piece of work

- a) 36 days
- b) 24 days
- c) 30 days
- d) 20 days

22) If A and B takes 9 and 16 days more to complete the work than (A +B) together. Find the number of days in which A alone can complete the 60% of the same piece of work

- a) 12.6 days
- b) 12 days
- c) 21 days
- d) 24days

23) If A and B together can complete the work in X days while A and B alone can complete the same piece of work in (X+12) and (X+3) days respectively. Find the efficiency ratio of A and B

- a) 1:2
- b) 2:1
- c) 1:4
- d) 4:1

24) A is twice efficient as B if work together they complete the work in 36days .Find the number of days in which A alone can complete this work

- a) 216 days
- b) 36 days
- c) 108 days
- d) 54 days

25) If A is 50% more efficient than B. if they work together they complete the work in 27 days .Find the number of days in which B alone can do this work

- a) 135 days
- b) $67 \frac{1}{2}$ days
- c) 270 days
- d) 45 days

26) 36 men can complete a work in 50 days, how long will 27 men take to complete the same of piece of work.

- a) 66 days 16 hours
- b) 33 days 8 hours
- c) 24 days
- d) D

27) 24 men can complete a work in $37 \frac{1}{2}$ days, how long will 75 men take to complete the twice of work.

- a) 32days
- b) 24 days
- c) 16 days
- d) 20 days

28) Working efficiencies of X and Y for completing a piece of work are in the ratio 4:5 , then the ratio of

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time taken by them to complete the same of piece of work is

- a) 24 : 36
- b) 4 : 5
- c) 5 : 4
- d) 3 : 2

29) 20 men or 30 women can complete a work in 15 days. In how many days will 45 men complete this work?

- a) 48days
- b) 24days
- c) 20days
- d) 12days

30) 10 men or 20 women or 30 boys can complete a work in 60 days. In how many days will 10 men and 20 women and 30 boys complete this work?

- a) 20days
- b) 25days
- c) 15days
- d) 30days

31) A can do a work in 10 days. The efficiency of A is 40% less than B. How many days B needs to finish the same work?

- a) 30/9 days
- b) 6 days
- c) 10 days
- d) 15 days

32) 8 men can build a temple in 24 days. How long would it take for 12 men to build the 3 temples?

- a) 32days
- b) 48 days
- c) 44 days
- d) 16 days

33) The efficiency ratio of A , B and C is 1:2:3 and the ratio of the time taken by them to complete a work in 2:3:6 find the ratio of amount of their work done

- a) 1:2:3
- b) 1:3:9
- c) 2:3:7
- d) 3:4:1

34) 50 men can complete a work in 50 days they started the work together but on after every 10 day 5 men left the job find the number of days in which the work will be completed

- a) 144 days
- b) 72 days
- c) 75 days
- d) 73 $\frac{1}{3}$ days

35) X men can complete a piece of work in 50 days if 10 men are absent then the work completes in 60 days find X

- a) 40 days
- b) 50 days
- c) 60 days

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d) 45 days

36) 6 women can do a work in 80 days. If the ratio of the capacity of a man and a woman is 2 : 1. In how many days it will taken by 10 men to complete 50% of the same work

a) 27days

b) 54days

c) 18 days

d) 12 days

37) If 40 person can do a job in 45 days, then in how many days 80 person with twice the efficiency can do the same job

a) 9 days

b) $11\frac{1}{4}$ days

c) 3 days

d) 27days

38) A halved his efficiency every day so he finishes his job in 4 days if he works with his actual efficiency then in how many days he will complete the same work

a) 3 days

b) $1\frac{7}{8}$ days

c) 4 days

d) 2 days

39) Ram does half as much work as Mohan in three fourths of the time. If together they take 24 days to

complete the work, how much time will Mohan take to do it?

a) 21days

b) 40 days

c) 81 days

d) 61 days

40) If 84 persons consume 256kg of rice in 18 days, then in how many days will 72 persons consume 64kg of rice?

a) $6\frac{1}{2}$ days

b) $5\frac{1}{4}$ days

c) $5\frac{2}{3}$ days

d) 6 days

41) 12 men can do a work in 8 days, after 4 days 4 more men were engaged to finish the work. In how many days would be the remaining work be completed

a) 3 days

b) 5 days

c) 2days

d) 4days

42) 2 men or 3 women or 4 boys can do a work in 104 days. Then in how many days will 1 man, 2 women and 3 boys together complete the same of work

a) 43 days

b) 48 days

c) 171 days

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d) 1248/23 days

43) If 2 men and 3 boys can do a work in 12 days, 4 men can do the same work in 20 days, in how many days will 2 men and 2 boys complete the work

a) 360/23 days

b) 360 days

c) 720 days

d) None of these

44) Each students of class A is thrice efficient as students of class B, if 20 students of class A can complete the work in 60 days then in how many days 60 students of class B can complete the same work

a) 90days

b) 60days

c) 120days

d) None of these

45) Raju finishes a work in 21 days working 8 hours a day and kaju finishes it in 14 days working 6 hours a day. In how many days they can finish it working together 6 hours a day

a) 28/3 days

b) 28 days

c) 14 days

d) 21 days

46) 26 persons can repair a road in 12 days working 6 hours a day .In how many days 6 person with half

efficiency will repair the same road working 12 hours a day

a) 48days

b) 36days

c) 52days

d) 72days

47) 12 men and 16 women together can do a work in 24 days then in how many days will 9 men and 12 women complete the same work?

a) 36 days

b) 9 days

c) 27 days

d) 18 days

48) Ram can wash a trouser in 60 min and he works for 8 hours a day. How many trousers can he washes in 6 days?

a) 48

b) 24

c) 36

d) 18

49) The wages of 15 men and 10 boys is 56 rupees, if 5 men together receive 2 rupees more than 6 boys, the wages of a man (approximately) is

a) 2 rupees

b) 3 rupees

c) 1 rupee

d) 2.54 rupees

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50) Ravi and Vinod can complete a work in 30 and 45 days respectively if they are turned on alternately for one day each starting with Ravi, then the time taken by them to complete the work is

- a) 60 days
- b) 64 days
- c) 36 days
- d) 35 days

Time and Work – Answers and Explanation

1) Answer: C

We know that **total work = efficiency (one day's work) × time**

Let the total work = 50 unit (LCM of 25, 50)

The ratio of one day's work of A and B = 50/25: 50/ 50 = 2: 1

One day's work of A and B together = (2+1) = 3 unit

The total number of days in which A and B together will complete the work = total work / one day's work = 50/3

Alternative Method

A's 1 day work = $1/25$, B's 1 day work = $1/50$

∴ (A+B) 1 day work = $(1/25+1/50) = 3/50$

The total number of days in which A and B together will complete the work = $50/3$

Hence option C is correct.

2) Answer: A

We know that **total work = efficiency (one day's work) × time**

Let the total work = 50 unit (LCM of 25, 50)

The ratio of one day's work of (A+B) and B = 50/25: 50/ 50 = 2: 1

If A+B = 2 and B = 1, then A = 1

The total number of days in which A will complete the work = total work / one day's work = 50/1

Alternative Method

(A+B) 's 1 day work = $1/25$, B's 1 day work = $1/50$

∴ A's 1 day work = $(1/25-1/50) = 1/50$

The total number of days in which A will complete the work = 50

Hence option A is correct.

3) Answer: A

We know that **total work = efficiency (one day's work) × time**

Let the total work = 60 unit (LCM of 20, 30, 60)

The ratio of one day's work of A and B, C = 60/20: 60/ 30: 60/60 = 3:2: 1

One day's work of A, B and C together = (3+2+1) = 6 unit

The total number of days in which A, B and C together will complete the work = total work / one day's work = $60/6 = 10$ Days

Hence option A is correct.

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4) Answer: C

We know that **total work = efficiency (one day's work) × time**

Let the total work = 50 unit (LCM of 25, 50)

The ratio of one day's work of A and B = $50/25$: $50/50 = 2$: 1

Because B destroys the work therefore one day's work of B = -1

One day's work of A and B together = $(2-1) = 1$ unit

The total number of days in which A and B together will complete the work = $\text{total work} / \text{one day's work} = 50/1 = 50\text{days}$

Hence option C is correct.

5) Answer: A

We know that **total work = efficiency (one day's work) × time**

Let the total work = 60 unit (LCM of 12, 30)

The ratio of one day's work of (A+B) and A = $60/12$: $60/30 = 5$: 2

If $A+B = 5$ and $A = 2$, then $B = 3$

The total number of days in which B will complete the 40% of work = $40\% \text{ of total work} / \text{one day's work} = 40\% \text{ of } 60/3 = 24/3 = 8\text{days}$

Hence option A is correct.

6) Answer: B

We know that **total work = efficiency (one day's work) × time**

Let the total work = 120 unit (LCM of 40, 20, 120)

The ratio of one day's work of A and B, C = $120/40$: $120/20$: $120/120 = 3$:6: 1

One day's work of A, B and C together = $(3+6+1) = 10$ unit

The total number of days in which A, B and C together will complete the work = $\text{total work} / \text{one day's work} = 2/3 \times 120/10 = 12 \times 2/3 = 8 \text{ days}$

Hence option B is correct.

7) Answer: C

We know that **total work = efficiency (one day's work) × time**

Let the total work = 50 unit (LCM of 25, 50)

The ratio of one day's work of A and B = $50/25$: $50/50 = 2$: 1

One day's work of A = 2unit

⇒ suppose B completed the rest of the work in x days then,

Total work = $3(A) + x.B = 50$

⇒ $3(2) + x.1 = 50$

X = 44 days

Alternative Method

A's 1 day work = $1/25$, B's 1 day work = $1/50$

⇒ suppose B completed the rest of the work in x days then,

$3/25 + X/50 = 1$

X=44

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Hence option C is correct.

8) Answer: B

We know that **total work = efficiency (one day's work) × time**

Let the total work = 45 unit (LCM of 45, 15)

The ratio of one day's work of A and B = 45/45: 45/15 = 1: 3

⇒suppose A completed the rest of the work in x days then,

$$\text{Total work} = 5.B + x.A = 45$$

$$\Rightarrow 5(3) + x.1 = 45$$

$$B = 30/1 \text{ days}$$

Alternative Method

A's 1 day work = 1/45, B's 1 day work = 1/15

⇒suppose A completed the rest of the work in x days then,

$$X/45 + 5/15 = 1$$

$$X = 30$$

Hence option B is correct.

9) Answer: B

We know that **total work = efficiency (one day's work) × time**

Let the total work = 60 unit (LCM of 60, 30)

The ratio of one day's work of A and B = 60/60: 60/30 = 1:2

One day's work of A and B together = (1+2) = 3 unit

⇒suppose B completed the rest of the work in x days then,

$$\text{Total work} = 3(A+B) + x. B = 60$$

$$\Rightarrow 3(3) + x.2 = 60$$

$$x = 51/2 \text{ days} = 25 \frac{1}{2} \text{ days}$$

Alternative Method

A's 1 day work = 1/60, B's 1 day work = 1/30

⇒suppose B completed the rest of the work in x days then,

$$3/60 + (X+3)/30 = 1$$

$$X = 25 \frac{1}{2} \text{ days}$$

Hence option B is correct.

10) Answer: B

We know that **total work = efficiency (one day's work) × time**

Let the total work = 54 unit (LCM of 18, 27)

The ratio of one day's work of A and B = 54/18: 54/27 = 3:2

One day's work of A and B together = (3+2) = 5 unit

⇒suppose A completed the rest of the work in x days then,

$$\text{Total work} = 5(A+B) + x. A = 54$$

$$\Rightarrow 5(5) + x.3 = 54$$

$$x = 29/3 \text{ days} = 9 \frac{2}{3} \text{ days}$$

Alternative Method

A's 1 day work = 1/60, B's 1 day work = 1/30

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⇒ suppose A completed the rest of the work in x days then,

$$(5+X)/18+5/27=1$$

$$X=9\frac{2}{3} \text{ days}$$

Hence option B is correct.

11) Answer: B

We know that **total work = efficiency (one day's work) × time**

Let the total work = 360 unit (LCM of 120, 180)

The ratio of one day's work of A and B = $360/120:360/180=3:2$

75% of work = 75% of 360 = 270 unit

Remaining work = $360 - 270 = 90$

⇒ suppose B completed the rest of the work in x days then,

$$\Rightarrow x \cdot B = 90 \Rightarrow x \cdot 2 = 90$$

$$x = 45 \text{ days}$$

Hence option B is correct.

12) Answer: A

We know that **total work = efficiency (one day's work) × time**

Let the total work = 60 unit (LCM of 20, 30)

The ratio of one day's work of A and B = $60/20:60/30=3:2$

One day's work of A and B together = $(3+2) = 5$ unit

⇒ suppose B completed the rest of the work in x days then,

$$\text{Total work} = 9(A+B) + x \cdot B = 60$$

$$\Rightarrow 9(5) + x \cdot 2 = 60$$

$$x = 15/2 \text{ days} = 7\frac{1}{2} \text{ days}$$

Hence option A is correct.

Alternative Method

A's 1 day work = $1/20$, B's 1 day work = $1/30$

⇒ suppose B completed the rest of the work in x days then,

$$9/20 + (X+9)/30 = 1$$

$$X = 7\frac{1}{2} \text{ days}$$

13) Answer: B

We know that **total work = efficiency (one day's work) × time**

Let the total work = 90 unit (LCM of 18, 45)

The ratio of one day's work of A and B = $90/18:90/45=5:2$

One day's work of A and B together = $(5+2) = 7$ unit

⇒ suppose A and B together work for x days

$$\text{Total work} = x(A+B) + 5 \times B = 90$$

$$\Rightarrow x(7) + 5 \times 2 = 90$$

$$x = 80/7 \text{ days} = 11\frac{3}{7} \text{ days}$$

Hence option B is correct.

14) Answer: B

We know that **total work = efficiency (one day's work) × time**

Let the total work = 216 unit (LCM of 54, 72)

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The ratio of one day's work of A and B = $216/54$:
 $216/72 = 4:3$

One day's work of A and B together = $(4+3) = 7$ unit

⇒ suppose A and B together work for x days

Total work = $x(A+B) + 10A = 216$

⇒ $x(7) + 10 \times 4 = 216$

$x = 176/7$ days = $25 \frac{1}{7}$ days

Hence option B is correct.

15) Answer: C

We know that **total work = efficiency (one day's work) × time**

Let the total work = 60 unit (LCM of 10, 15, 20)

The ratio of one day's work of A and B and C = $60/10$:
 $60/15$: $60/20 = 6:4:3$

One day's work of (A+B), (B+C) and (C+A) together =
 $(6+4+3)/2 = 13/2 = 6.5$ unit

The total number of days in which A, B and C together will complete the work = total work / one day's work =
 $60/6.5 = 120/13$

Hence option C is correct.

16) Answer: A

We know that **total work = efficiency (one day's work) × time**

Let the total work = 216 unit (LCM of 72, 36, 54)

The ratio of one day's work of A and B and C = $216/72$:
 $216/36$: $216/54 = 3:6:4$

One day's work of (A+B), (B+C) and (C+A) together =
 $(3+6+4)/2 = 13/2 = 6.5$ unit

The total number of days in which A, B and C together will complete the 50% of work = total work / one day's work = 50% of $216/6.5 = 16 \frac{8}{13}$ days

Hence option A is correct.

17) Answer: C

A completes $\frac{2}{3}$ rd work in 10 days

∴ A can complete full work = $10 \times \frac{3}{2} = 15$ days

And

B completes $\frac{1}{5}$ th work in 3 days

∴ B can complete full work = $3 \times 5 = 15$ days

We know that **total work = efficiency (one day's work) × time**

Let the total work = 15 unit (lcm of 15, 15)

The ratio of one day's work of A and B = $15/15$: $15/15 = 1:1$

One day's work of A and B together = $(1+1) = 2$ unit

The total number of days in which A and B together will complete the work = total work / one day's work = $15/2 = 7 \frac{1}{2}$ days

Hence option C is correct.

18) Answer: C

A completes $\frac{1}{3}$ rd work in 15 days

∴ A can complete full work = $15 \times 3 = 45$ days

And

B completes $\frac{1}{4}$ th work in 15 days

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\therefore B can complete full work = $4 \times 15 = 60$ days

We know that **total work = efficiency (one day's work) \times time**

Let the total work = 180 unit (lcm of 45, 60)

The ratio of one day's work of A and B = $180/45$:
 $180/60 = 4:3$

One day's work of A and B together = $(4+3) = 7$ unit

The total number of days in which A and B together will complete the 60% of the work = total work / one day's work = 60% of $180/7 = 108/7 = 15 \frac{3}{7}$

Hence option C is correct.

19) Answer: A

We know that **total work = efficiency (one day's work) \times time**

Let the total work = 60 unit (LCM of 20, 15)

The ratio of one day's work of A and B = $60/20:60/15 = 3:4$

One day's work of A and B together = $(3+4) = 7$ unit

\Rightarrow suppose (A+B) work for x days and the rest of the work is done by A in 8 days

$\therefore x(A+B) + 8A = 60$

$\Rightarrow x(7) + 8(3) = 60$

$x = 36/7$ days $= 5 \frac{1}{7}$ days

So B works for $5 \frac{1}{7}$ days

Hence option A is correct.

20) Answer: A

We know that **total work = efficiency (one day's work) \times time**

Let the total work = 720 unit (LCM of 180, 240)

The ratio of one day's work of A and B = $720/180$:
 $720/240 = 4:3$

One day's work of A and B together = $(4+3) = 7$ unit

\Rightarrow suppose (A+B) work for x days and the rest of the work is done by B in 40 days

$\therefore x(A+B) + 40B = 720$

$\Rightarrow x(7) + 40(3) = 720$

$x = 600/7$ days

Hence option A is correct.

21) Answer: B

If A takes x days more and B takes y days more to complete the work than (A+B) then number of days taken by (A+B) to complete the work = \sqrt{XY}

Hence the time taken by A + B to complete the work = $\sqrt{(18 \times 32)}$

$= 3 \times 8$

$= 24$ days

Hence option B is correct.

22) Answer: A

If A takes x days more and B takes y days more to complete the work than (A+B) then number of days taken by (A+B) to complete the work = \sqrt{XY}

Hence the time taken by A + B to complete the work = $\sqrt{(9 \times 16)}$

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$$= 3 \times 4$$

$$= 12 \text{ days}$$

So the time taken by A = $12 + 9 = 21$ days

Hence A can complete the 60% of the work in = 60% of 21 = 12.6 days

Option A is correct.

23) Answer: A

If A takes x days more and B takes y days more to complete the work than (A+B) then number of days taken by (A+B) to complete the work = \sqrt{XY}

Hence the time taken by A +B to complete the work = $\sqrt{(12 \times 3)}$

$$= 6 \text{ days}$$

$$\therefore x = 6 \text{ days}$$

A takes $(6+12) = 18$ days and B takes $(6+3) = 9$ days

Time ratio of A and B = 2:1

Hence efficiency ratio of A and B is 1:2

So option A is correct.

24) Answer: D

It is given that efficiency (one day's work) ratio of A and B is 2:1

One day's work of A and B together = $(2+1) = 3$ unit

If they work together then they complete the work in 36 days

Hence total work is = $36 \times 3 = 108$ unit

If A do this work alone then the time taken by A to complete the work

$$108/2 = 54 \text{ days}$$

Hence option D is correct.

25) Answer: B

If we assume the efficiency of B is 100, then efficiency of A must be 150

So efficiency (one day's work) ratio of A and B is 150:100 = 3:2

One day's work of A and B together = $(3+2) = 5$ unit

If they work together then they complete the work in 27 days

Hence total work is = $27 \times 5 = 135$ unit

If A do this work alone then the time taken by B to complete the work

$$135/2 = 67 \frac{1}{2} \text{ days}$$

Hence option B is correct.

26) Answer: A

Using formula:

$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where M = men, D = days, H= hours and W = work

$$\Rightarrow 36 \times 50 = 27 \times D$$

$$D = 200/3 = 66 \frac{2}{3} = 66 \text{ days } 16 \text{ hours}$$

Hence option A is correct.

27) Answer: B

Using formula:

$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where M = men, D = days, H= hours and W = work

$$\Rightarrow (24 \times 75/2) / 1 = 75 \times D / 2$$

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$\Rightarrow D = 24$ days

Hence option B is correct.

28) Answer: C

We know that the for the same piece of work the time ratio is always inversely proportion to efficiency ratio

It is given that the efficiency ratio is 4 : 5 than time ratio will be 5 : 4.

Hence option C is correct.

29) Answer: C

It is given that work done by 20 men is same as the work done by the 30 women in 15 days. So

$$\Rightarrow 20 \text{ men} \times 15 = 30 \text{ women} \times 15$$

So 1men / 1women = $\frac{3}{2}$ (this is efficiency ratio)

The total work = $20(3) \times 15 = 900$ unit

If the same work is done by 45 men then

$$45 \times D = 900$$

$$D = 20 \text{ days}$$

Hence option C is correct.

30) Answer: A

Total work is given by-

$$10 \text{ men} \times 60 = 20 \text{ women} \times 60 = 30 \text{ boys} \times 60$$

$$10 \text{ men} = 20 \text{ women} = 30 \text{ boys} = K$$

Efficiency ratio of Men: women : boy = 6:3:2

$$\text{Total work} = 10 \times (6) \times 60 = 3600$$

The amount of work done by (10 men + 20 women + 30 boys) in a day = $10(6) + 20(3) + 30(2) = 180$

So the total number of days required to complete the work = $3600 / 180 = 20$ days.

So option A is correct.

31) Answer: B

The efficiency ratio of A and B = $60 : 100 = 3 : 5$

It is given that A can do work in 10 days so

$$\text{Total work} = 3 \times 10 = 30 \text{ unit}$$

The number of days in which B will complete this work = $\text{total work} / \text{one day's work} = 30/5 = 6$

Hence option B is correct.

Alternative method

The efficiency ratio of A and B = $60 : 100 = 3 : 5$

Ratio of times taken by A and B = 5:3

Suppose B alone takes x days to do the job

$$5:3::10:x$$

$$X = 6 \text{ days}$$

32) Answer: B

Using formula:

$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where M = men, D = days, H= hours and W = work

$$(8 \times 24) / 1 = (12 \times D) / 3$$

$$D = 48 \text{ days}$$

Hence option B is correct.

33) Answer: B

We know that **total work = efficiency (one day's work) \times time**

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The ratio of amount of work done by A,B and C =

$$1 \times 2 : 2 \times 3 : 3 \times 6$$

$$\Rightarrow 2 : 6 : 18 = 1 : 3 : 9$$

Hence option B is correct.

34) Answer: D

$$\text{Total work} = 50 \times 50 = 2500 \text{ units}$$

$$\text{First 10 day's work} = 50 \times 10 = 500 \text{ units}$$

$$\text{Next 10 day's work} = 45 \times 10 = 450 \text{ units}$$

$$\text{Next 10 day's work} = 40 \times 10 = 400 \text{ units}$$

$$\text{Next 10 day's work} = 35 \times 10 = 350 \text{ units}$$

$$\text{Next 10 day's work} = 30 \times 10 = 300 \text{ units}$$

$$\text{Next 10 day's work} = 25 \times 10 = 250 \text{ units}$$

$$\text{Next 10 day's work} = 20 \times 10 = 200 \text{ units}$$

$$\text{Total work done in 70 days} = 2450 \text{ units}$$

$$\text{Remaining work} = 2500 - 2450 = 50 \text{ units}$$

Remaining work will be done by 15 men in D days so-

$$15D = 50$$

$$D = 50/15 = 10/3 \text{ days}$$

$$\text{So the total number of days} = 70 + 3 \frac{1}{3} = 73 \frac{1}{3} \text{ days}$$

Hence option D is correct.

35) Answer: C

Using formula:

$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where M = men, D = days, H= hours and W = work

$$X \times 50 = (X-10) \times 60$$

$$X = 60$$

Hence option C is correct.

36) Answer: D

$$\text{Total work} = 6 \text{ women} \times 80 \text{ days}$$

$$\text{Capacity ratio of a man and a woman} = 2:1$$

$$\text{So the total work} = 6(1) \times 80 = 480 \text{ unit}$$

$$50\% \text{ of this work} = 240 \text{ unit}$$

$$\text{One day's work of 10 men} = 10(2) = 20 \text{ unit}$$

$$\text{So the time taken by 10 men to complete the 50\% of work} = 240/20 = 12 \text{ days}$$

Hence option D is correct.

37) Answer: B

Using formula:

$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where M = men, D = days, H= hours and W = work

$$40 \times 45 = 80(2) \times D$$

$$D = 45/4 \text{ days} = 11 \frac{1}{4} \text{ days}$$

38) Answer: B

Assume that the actual efficiency of A is 4 units a day

It is given that A halved his efficiency every day and complete the work in 4 days

The efficiency ratio of A is 8:4:2:1

$$\text{Total work} = (8 + 4 + 2 + 1) = 15 \text{ unit}$$

If he do this work with his actual efficiency then,

$$\Rightarrow 8 \times D = 15$$

$$D = 1 \frac{7}{8} \text{ days}$$

Hence option B is correct.

39) Answer: B

Using formula:

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$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where **M = men, D = days, H= hours and W = work**

Let B takes T time to complete W work then,

$$(\text{Ram} \times 3/4 T) / (W/2) = \text{Mohan} \times T / W$$

$$\therefore \text{Ram} / \text{Mohan} = 2/3$$

One day's work of Ram and Mohan together = $(2+3) = 5$ unit

$$\text{Total work} = 5 \times 24 = 120$$

If Mohan works alone then the number of days taken by him to complete the work = $120/3 = 40$ days

Hence option B is correct.

40) Answer: B

Using formula:

$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where **M = men, D = days, H= hours and W = work**

$$84 \times 18 / 256 = 72 \times D / 64$$

$$D = 5 \frac{1}{4} \text{ days}$$

Hence option B is correct.

41) Answer: A

$$\text{Total work} = 12 \times 8 = 96 \text{ unit}$$

$$\text{Work done in 4 days} = 12 \times 4 = 48 \text{ unit}$$

$$\text{Remaining} = 96 - 48 = 48 \text{ unit}$$

This remaining work is done by 16 men

So the number of days in which remaining work is done by = $48/16 = 3$ days

42) Answer: D

Assume that the efficiency of a man, a woman and a boy are M, W, B respectively.

$$\text{Total work} = 2M \times 104 = 3W \times 104 = 4B \times 104$$

$$= 2M = 3W = 4B = k$$

$$\Rightarrow M: W: B = 6:4:3$$

$$\text{Total work} = 2(6) \times 104 = 12 \times 104$$

$$\text{One day work by 1 man, 2 women and 3 boys} = 1(6) + 2(4) + 3(3) = 23 \text{ unit}$$

So the number of days in which the work will be completed = $12 \times 104 / 23 = 1248 / 23$ days

43) Answer: A

Assume that the efficiency of a man and a boy are M, B respectively.

$$\text{Total work} = (2M + 3B) \times 12 = 4M \times 20$$

$$\Rightarrow 36B = 56M$$

$$M : B = 9 : 14$$

$$\therefore \text{Total work} = 4(9) \times 20 = 720 \text{ unit}$$

$$\text{One day's work by 2 men and 2 boys} = 2(9) + 2(14) = 46 \text{ unit}$$

So the number of days in which the work will be completed = $720 / 46$ days = $360 / 23$ days

44) Answer: B

The efficiency ratio of each student of class A and B = 3:1

It is given that 20 students of class A can do work in 60 days so

$$\text{Total work} = 20 \times 3 \times 60 = 3600 \text{ unit}$$

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The number of days in which 60 students of class B will complete this work = total work / one day's work = $3600/60(1) = 60$ days

Hence option B is correct.

45) Answer: A

Assume that the efficiency of Raju and Kaju are R, K respectively

Using formula:

$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where M = men, D = days, H = hours and W = work

$$R \times 21 \times 8 = K \times 14 \times 6$$

So the efficiency ratio of Raju and Kaju = 1:2

$$\text{Total work} = 1 \times 21 \times 8 = 168 \text{ units}$$

One day's work of Raju and Kaju together = $1 + 2 = 3$ units

$$\text{Then total work} = (R+K) \times 6 \times D = 168$$

$$\Rightarrow 3 \times 6 \times D = 168$$

$$\Rightarrow D = 28/3 \text{ Days}$$

Hence option A is correct.

46) Answer: C

Assume that the efficiency of a person is 1 unit.

Using formula:

$$M_1 \times D_1 \times H_1 / W_1 = M_2 \times D_2 \times H_2 / W_2$$

Where M = men, D = days, H = hours and W = work

$$\Rightarrow 26(1) \times 12 \times 6 = 6(1/2) \times 12 \times D$$

$$D = 52 \text{ Days}$$

Hence option C is correct.

47) Answer: D

Assume that the efficiency of a man and a woman are M, W respectively.

$$(12M+16W) = 24 \text{ Days} \dots\dots\dots (1)$$

Multiplying equation (1) by $\frac{3}{4}$

We get

$$\frac{3}{4} (12M+16W) = 24 \times \frac{3}{4}$$

$$(9M + 12W) = 18 \text{ days}$$

Hence option D is correct.

48) Answer: A

Ram can wash a trouser in 60 min (1 hour) and he works only for 8 hours in a day

So he can wash 8 trousers in a day.

$$\text{In 6 days he can wash} = 6 \times 8 = 48 \text{ trousers}$$

49) Answer: D

It is given that the total wages of 15 men and 10 boys is 56

$$15 \text{ men} + 10 \text{ boys} = 56 \dots\dots\dots (1)$$

And 5 men together receive 2 rupees more than 6 boys

$$5 \text{ men} - 6 \text{ boys} = 2 \dots\dots\dots (2)$$

By solving equations 1 and 2, we get

$$1 \text{ men} = 178/70 = 2.54 \text{ rupees}$$

Hence option D is correct.

50) Answer: C

We know that **total work = efficiency (one day's work) × time**

$$\text{Let the total work} = 90 \text{ unit (LCM of 30, 45)}$$

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The ratio of one day's work of Ravi and Vinod = $90/30$:

$$90/45 = 3:2$$

Two day's work of Ravi and Vinod = $(3+2)/2 = 5$

The average work done in one day = 2.5 unit

The total number of days in which Ravi and Vinod will complete the work = total work / one day's work =

$$90/2.5 = 36 \text{ days}$$

Hence option C is correct.

Trigonometry

1. If $\sec \theta + \tan \theta = m$, then $\sec \theta - \tan \theta = ?$

a) m

b) $1/m$

c) $m^{1/2}$

d) m^2

2. If $x = p \cos \alpha * \cos \beta$, $y = p \cos \alpha \sin \beta$ and $z = p \sin \alpha$, then find the value of $x^2 + y^2 + z^2$?

a) y^2

b) x^2

c) p^2

d) z^2

3. If $2p = \sec A$ and $\left(\frac{2}{p}\right) = \tan A$, then find the value of $2\left(p^2 - \frac{1}{p^2}\right)$?

a) 1

b) $1/2$

c) $1/4$

d) $1/3$

4. If $(\tan \theta + \cot \theta) = 9$, then find the value of $(\tan^2 \theta + \cot^2 \theta)$?

a) 77

b) 78

c) 79

d) 81

5. If $\tan^4 \theta + \tan^2 \theta = 21$, then $\sec^4 \theta - \sec^2 \theta = ?$

a) 22

b) 21

c) 23

d) 20

6. If $\sec \theta + \tan \theta = 0.25$, then $\sec \theta - \tan \theta = ?$

a) 5

b) 625

c) 4

d) 8

7. If $\tan A + \cot A = 12$, then, find the value of $\tan^2 A + \cot^2 A$?

a) 144

b) 142

c) 141

d) $1/144$

8. If $\operatorname{cosec} \theta - \sin \theta = p$ and $\sec \theta - \cos \theta = q$, then which of the following is correct?

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a) $(p^2q)^{\frac{2}{3}} - (pq^2)^{\frac{2}{3}} = 1$

b) $\sin \theta \sec \theta = \frac{1}{p}$

c) $\sin \theta \tan \theta = \frac{1}{q}$

d) $(p^2q)^{\frac{2}{3}} + (pq^2)^{\frac{2}{3}} = 1$

9. If $\sec \theta - \operatorname{cosec} \theta = 0$, then find the value of $\sin^4 \theta + \cos^4 \theta + \tan^4 \theta$.

a) $\frac{5}{4}$

b) $\frac{3}{2}$

c) $\frac{7}{4}$

d) 2

10. Find the value of $\cos^4 \alpha - \sin^4 \alpha$?

a) $\cos 2\alpha$

b) $\sin^2 \alpha + \cos^2 \alpha$

c) $\cos^2 \alpha$

d) $2\cos^2 \alpha$

11. Simplify:

$$(\sin^2 \theta / \cos \theta) + (\cos^2 \theta / \cos \theta)$$

a) $\operatorname{cosec} \theta$

b) $\sin \theta$

c) $\cos \theta$

d) $\sec \theta$

12. In ΔABC , $\sin (A + B)/2 = ?$

a) $\cos C$

b) $\cos C/2$

c) $\sin (C + A)/2$

d) $\cot C$

13. Find the value of $\sin 75^\circ$.

a) $\frac{\sqrt{6} + \sqrt{2}}{4}$

b) $\frac{\sqrt{6} - \sqrt{2}}{4}$

c) $\frac{\sqrt{3} - 1}{2\sqrt{2}}$

d) $\frac{\sqrt{3} + 1}{2}$

14. $\frac{2\tan 45^\circ}{1 + \cot 45^\circ} + \frac{1 + \cot 45^\circ}{\tan 45^\circ} = ?$

a) 4

b) 8

c) $4 - 2\sqrt{3}$

d) 3

15. If $\sec(A - B) = \frac{\sec A \sec B}{1 + \tan A \tan B}$, then find the value of $\sec 15^\circ$?

a) $\sqrt{6} - \sqrt{3}$

b) $\sqrt{6} - \sqrt{2}$

c) $\sqrt{6} + \sqrt{3}$

d) $\sqrt{6} + \sqrt{2}$

16. $\frac{5\sin^2 30^\circ + 4\operatorname{cosec}^2 60^\circ - \tan^2 45^\circ}{\cos^2 30^\circ + \sin^2 30^\circ} = ?$

a) $\frac{12}{65}$

b) $\frac{49}{13}$

c) $\frac{87}{12}$

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d) $\frac{67}{12}$

17. What is the value of $\tan(405^\circ)$?

a) 1

b) -1

c) 0

d) $-\sqrt{2}$

18. $\tan(1125^\circ) = ?$

a) 1

b) $-1/2$

c) 2

d) ∞

19. Find the value of $\sin \frac{7\pi}{4} \sin \frac{\pi}{4} \sin \frac{3\pi}{4} \sin \frac{5\pi}{4}$.

a) $\frac{1}{4}$

b) $\frac{1}{8}$

c) $\frac{1}{16}$

d) $\frac{3}{16}$

20. If $\cot^2 45^\circ - \cos^2 60^\circ =$

$x \sin 45^\circ \cos 45^\circ \cot 30^\circ$, then, find the value of 'x'.

a) $\frac{\sqrt{3}}{2}$

b) 0

c) $\frac{2}{3}$

d) $\frac{1}{2}$

21. Find the value of $\tan^2 60^\circ - 2\cot^2 45^\circ - \cot^2 30^\circ + 2\sin^2 30^\circ + 3/4 \sec^2 45^\circ$.

a) $-\frac{\sqrt{3}}{2}$

b) 0

c) 2

d) -1

22. Find the value of

$\tan 18^\circ \tan 22^\circ \cot 60^\circ \tan 68^\circ \tan 72^\circ$.

a) $\sqrt{3}$

b) $\frac{2}{\sqrt{3}}$

c) $\frac{1}{\sqrt{3}}$

d) $\sqrt{3}/2$

23. $\sin^2 60^\circ + \cos^2 30^\circ + \tan^2 45^\circ + \operatorname{cosec}^2 30^\circ =$
?

a) $\frac{17}{2}$

b) $\frac{25}{2}$

c) $\frac{13}{2}$

d) $\frac{5}{2}$

24. By taking the angle $(\beta) = 45^\circ$, find the sum of the values of all six trigonometric ratios?

a) $2 + 3\sqrt{2}$

b) $\frac{2+3\sqrt{2}}{3}$

c) $6/7$

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d) $3 + 5\sqrt{2}$

25. Find the value of $\tan 26^\circ \cdot \tan 48^\circ \cdot \tan 42^\circ \cdot \tan 64^\circ$:

a) 0

b) 1

c) $1/3$

d) $2/3$

26. If $\sec A = 13/12$, then $\sin A(1 - \tan A) = ?$

a) $33/138$

b) $32/139$

c) $35/155$

d) $35/156$

27. If $\tan \theta = \frac{b}{a}$, then find the value of $\frac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta}$.

a) $b+1/a$

b) $(a-b)/(a+b)$

c) $a/b+1$

d) a/b^2

28. If $\cot \theta = \frac{5}{6}$, then what is the value of $\frac{12\cos \theta - 5\sin \theta}{12\cos \theta + 5\sin \theta}$ =?

a) 1

b) $\frac{1}{3}$

c) 0

d) $\frac{5}{4}$

29. If $\sin \theta = \frac{4}{5}$, then find the value of $\sin \theta + \cos \theta$.

($\sin \theta$ and $\cos \theta$ both are positive)

a) $1/3$

b) 3

c) $2\frac{1}{5}$

d) $1\frac{2}{5}$

30. If $\cot A = \frac{8}{15}$ and $\cot B = \frac{24}{7}$, then $\tan(A - B) = ?$

a) $\frac{304}{297}$

b) $\frac{314}{455}$

c) $\frac{446}{187}$

d) $\frac{187}{416}$

31. If $4\cot \theta = 5$, then find the value of $(3\sin \theta - 2\cos \theta) \div (2\sin \theta + 3\cos \theta)$.

a) $6/13$

b) $2/23$

c) $4/13$

d) $5/13$

32. From the initial position of a car, the angle of elevation of top of the 72 m tall tower was 60° . Moving away from the tower, the angle of elevation to the top of the tower changed to 30° . How far did the car move from its initial position?

a) 48meter

b) $67\sqrt{3}$ meter

c) $48\sqrt{3}$ meter

d) $69\sqrt{3}$ meter

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33. From the top of a house, the angle of elevation of a tower was 30° . The height of the tower was 45 meters and the horizontal distance between the house and the tower was $40\sqrt{3}$ meters. What was the height of the house?

- a) 15meter
- b) 5meter
- c) $15\sqrt{3}$ meter
- d) $10\sqrt{3}$ meter

34. If $\sin A = 4/5$, then $\tan A + \cos A = ?$

- a) 11/23
- b) 12/15
- c) 16/11
- d) 29/15

35. If $A + B = 90^\circ$ and $\sin A = \frac{1}{3}$, then find the value of $\cos B$:

- a) 1/7
- b) 2/3
- c) 1/3
- d) 3/4

36. When viewed from a distance of 300 meters from the flight point, the angle of elevation of an airplane going upward in the vertical direction changes from 30° at 6:00 am, to 60° at 6:02 am.

Find the speed of the airplane in upward direction. ($\sqrt{3} = 1.732$)

- a) 2.5m/s
- b) 1.18 m/s
- c) 4.4 m/s
- d) 2.9 m/s

37. The elevation angle of a ladder supported by a wall is 45° and its lower end is 10 meters from the wall. Find the height of the ladder.

- a) $10\sqrt{2}$ meter
- b) $13\sqrt{2}$ meter
- c) $5\sqrt{2}$ meter
- d) $6\sqrt{2}$ meter

38. The angle of depression of the foot of a building from the top of a tower of $32\sqrt{3}$ meters high is 60° . How far is the building from the tower?

- a) 32meter
- b) $36\sqrt{3}$ meter
- c) $16\sqrt{3}$ meter
- d) 48meter

39. From the top of a house, the elevation angle of the top of the tower at a distance of $50\sqrt{3}$ m is 30° . If the height of the tower is 60 m, what will be the height of the house?

- a) $15\sqrt{3}$ m
- b) 10 m

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c) 20 m

d) $25\sqrt{3}$ m

So, height of house = 10 meter

40. From the initial position of a car, the elevation angle of the top of a 43.5 m tall tower was 60° . Car moves in a straight line from the position of the tower in such a way that the angle of elevation of the top of the tower from its final position becomes 30° . So how much distance the car moved?

a) $\frac{19}{3}\sqrt{2}$ meter

b) $29\sqrt{3}$ meter

c) $\frac{19}{2}\sqrt{5}$ meter

d) 39 meter

41. Two houses of 5 m and 10 m stand straight on the ground. If the distance between their bases is 12 m, find the distance between their top.

a) 17 meter

b) 18 meter

c) 13 meter

d) 15 meter

42. The length of the shadow of a tower decreases by 24 m. When the angle of elevation of the Sun increases from 30° to 60° , what is the height of the tower?

a) $15\sqrt{3}$

b) $18\sqrt{3}$

c) $8\sqrt{3}$

d) $12\sqrt{3}$

43. If $\cos \theta + \sin \theta = p$, $\sec \theta + \operatorname{cosec} \theta = q$, then what is the value of p/q ?

a) 1

b) $\sin \theta \cos \theta$

c) $\operatorname{cosec} \theta \tan \theta$

d) $\cos \theta \tan \theta$

44. If $4\sin \theta - 3\cos \theta = 0$, then $\sec \theta \operatorname{cosec} \theta = ?$

a) $5/12$

b) $25/12$

c) $13/12$

d) $12/5$

45. If $\cot 52^\circ = b$, then $\tan 38^\circ = ?$

a) \sqrt{b}

b) $\sqrt{b}/2$

c) $-b$

d) b

46. Evaluate: $\frac{\sin 23^\circ}{\cos 67^\circ}$

a) $1/2$

b) 2

c) 1

d) $\frac{2}{3}$

47. Find the value of $\sin 120^\circ \sin 240^\circ \sin 270^\circ$.

a) $-1/8$

b) $-1/2$

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c) $\frac{3}{4}$

d) $\frac{1}{8}$

48. If $0^\circ < \theta \leq 90^\circ$ and $\cos^2 \theta - 3 \cos \theta + 2 = 2 \sin^2 \theta$, then find the value of θ .

a) 30°

b) 60°

c) 90°

d) 45°

49. Simplify: $\cos \theta / (1 + \sin \theta)$

a) $\operatorname{cosec} \theta + \cot \theta$

b) $\sec \theta - \tan \theta$

c) $\operatorname{cosec} \theta - \cot \theta$

d) $\sec \theta + \tan \theta$

50. If $x = a \sec \theta + b \tan \theta$ and $y = a \tan \theta + b \sec \theta$, then find the value of $x^2 - y^2$?

a) $a^3 + b^3$

b) $a + b$

c) $\sqrt{a^2 + b^2}$

d) $a^2 - b^2$

Trigonometry – Answers and Explanation

1) Answer: B

$$\sec \theta + \tan \theta = m$$

Multiplying by $(\sec \theta - \tan \theta)$ in both the sides

$$\sec^2 \theta - \tan^2 \theta = m(\sec \theta - \tan \theta)$$

$$(\because \sec^2 \theta - \tan^2 \theta = 1)$$

$$1 = m(\sec \theta - \tan \theta)$$

$$\sec \theta - \tan \theta = \frac{1}{m}$$

$$\boxed{\sec \theta - \tan \theta = 1/m}$$

2) Answer: C

Given-

$$x = p \cos \alpha \cos \beta \dots \dots \dots (1)$$

$$y = p \cos \alpha \sin \beta \dots \dots \dots (2)$$

$$z = p \sin \alpha \dots \dots \dots (3)$$

Adding Equation (1), (2) and (3) after making square-

$$x^2 + y^2 + z^2 = p^2 \cos^2 \alpha \cos^2 \beta + p^2 \cos^2 \alpha \sin^2 \beta + p^2 \sin^2 \alpha$$

$$= p^2 \cos^2 \alpha [\cos^2 \beta + \sin^2 \beta] + p^2 \sin^2 \alpha$$

$$= p^2 \cos^2 \alpha + p^2 \sin^2 \alpha [\because \sin^2 \beta + \cos^2 \beta = 1]$$

$$= p^2 (\sin^2 \alpha + \cos^2 \alpha)$$

$$\boxed{x^2 + y^2 + z^2 = p^2}$$

3) Answer: B

$$2p = \sec A \dots \dots \dots (i)$$

$$\frac{2}{p} = \tan A \dots \dots \dots (ii)$$

Subtracting equation (i) and (ii) after making square-

$$4p^2 - \frac{4}{p^2} = \sec^2 A - \tan^2 A$$

$$\{\sec^2 A - \tan^2 A = 1\}$$

$$\text{or, } 4 \left(p^2 - \frac{1}{p^2} \right) = 1$$

$$\text{or, } 2 \left(p^2 - \frac{1}{p^2} \right) = \frac{1}{2}$$

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4) Answer: C

$$\tan \theta + \cot \theta = 9 \dots\dots\dots(i)$$

Squaring both side,

$$\tan^2 \theta + \cot^2 \theta + 2 \tan \theta \cdot \cot \theta = 81 \quad [\tan \theta \cdot \cot \theta = 1]$$

$$\tan^2 \theta + \cot^2 \theta = 81 - 2 = 79$$

5) Answer: B

$$\therefore \tan^4 \theta + \tan^2 \theta = 21$$

$$\therefore \tan^2 \theta (1 + \tan^2 \theta) = 21$$

$$\tan^2 \theta \cdot \sec^2 \theta = 21$$

$$(\sec^2 \theta - 1)\sec^2 \theta = 21 \{\because 1 + \tan^2 \theta = \sec^2 \theta\}$$

$$\sec^4 \theta - \sec^2 \theta = 21$$

6) Answer: C

$$\text{Given- } \sec \theta + \tan \theta = 0.25 \dots\dots(i)$$

Multiplying $(\sec \theta - \tan \theta)$ in both sides-

$$(\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = 0.25(\sec \theta - \tan \theta)$$

$$\sec^2 \theta - \tan^2 \theta = 0.25(\sec \theta - \tan \theta)$$

$$\therefore (\sec^2 \theta - \tan^2 \theta = 1)$$

$$\therefore (\sec \theta - \tan \theta) = \frac{1}{0.25}$$

$$(\sec \theta - \tan \theta) = 4$$

7) Answer: B

$$\text{Given, } \tan A + \cot A = 12$$

Squaring both side,

$$(\tan A + \cot A)^2 = 144$$

$$\tan^2 A + \cot^2 A + 2 \tan A \cot A = 144$$

$$\tan^2 A + \cot^2 A + 2 \times 1 = 144 (\because \tan A \cot A = 1)$$

$$\tan^2 A + \cot^2 A = 144 - 2 = 142$$

8) Answer: D

Given-

$$\operatorname{cosec} \theta - \sin \theta = p$$

$$\therefore \frac{1}{\sin \theta} - \sin \theta = p$$

$$\frac{1 - \sin^2 \theta}{\sin \theta} = p$$

$$\cos^2 \theta = p \sin \theta$$

$$p = \frac{\cos^2 \theta}{\sin \theta}$$

and,

$$\sec \theta - \cos \theta = q$$

$$\frac{1}{\cos \theta} - \cos \theta = q$$

$$\frac{1 - \cos^2 \theta}{\cos \theta} = q$$

$$\sin^2 \theta = q \cos \theta$$

$$q = \frac{\sin^2 \theta}{\cos \theta}$$

So,

$$p^2 q = \frac{\cos^4 \theta}{\sin^2 \theta} \times \frac{\sin^2 \theta}{\cos \theta}$$

$$p^2 q = \cos^3 \theta$$

$$(p^2 q)^{\frac{1}{3}} = \cos \theta$$

$$(p^2 q)^{\frac{2}{3}} = \cos^2 \theta \dots (i)$$

Thus,

$$(q^2 p)^{\frac{2}{3}} = \sin^2 \theta \dots (ii)$$

Adding equation (i) and equation (ii) -

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$$(p^2q)^{\frac{2}{3}} + (pq^2)^{\frac{2}{3}} = 1 (\because \sin^2 \theta + \cos^2 \theta = 1)$$

9) Answer: B

$$\begin{aligned} \sec \theta - \operatorname{cosec} \theta &= 0 \\ \sec \theta &= \operatorname{cosec} \theta \\ \theta &= 45^\circ \quad (\sec \theta = \operatorname{cosec} \theta) \\ \theta &= 45^\circ \\ \sin^4 \theta + \cos^4 \theta + \tan^4 \theta &= \sin^4 (45^\circ) + \cos^4 (45^\circ) + \tan^4 (45^\circ) \\ &= \left(\frac{1}{\sqrt{2}}\right)^4 + \left(\frac{1}{\sqrt{2}}\right)^4 + (1)^4 \\ &= \frac{1}{4} + \frac{1}{4} + 1 = \frac{2}{4} + 1 = \frac{1}{2} + 1 = \frac{3}{2} \end{aligned}$$

10) Answer: A

$$\begin{aligned} \cos^4 \alpha - \sin^4 \alpha &= (\cos^2 \alpha)^2 - (\sin^2 \alpha)^2 \\ &= (\cos^2 \alpha + \sin^2 \alpha)(\cos^2 \alpha - \sin^2 \alpha) \\ &= \cos^2 \alpha - \sin^2 \alpha \quad \{\because \cos^2 \alpha + \sin^2 \alpha = 1\} \\ &= \cos 2\alpha \end{aligned}$$

11) Answer: D

$$\begin{aligned} \frac{\sin^2 \theta}{\cos \theta} + \frac{\cos^2 \theta}{\cos \theta} &= \left(\frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta}\right) \\ \frac{1}{\cos \theta} &= \sec \theta \end{aligned}$$

12) Answer: B

$$\begin{aligned} \because A + B + C &= 180^\circ \\ A + B &= 180 - C \\ \sin \frac{(A+B)}{2} &= \sin \frac{(180^\circ - C)}{2} \\ &= \sin \left(90^\circ - \frac{C}{2}\right) \\ &= \cos \frac{C}{2} \end{aligned}$$

13) Answer: A

$$\begin{aligned} \sin (75^\circ) &= \sin (45^\circ + 30^\circ) \\ &= \sin 45^\circ \cdot \cos 30^\circ + \cos 45^\circ \cdot \sin 30^\circ \\ &= \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{2} \\ &= \frac{\sqrt{3}}{2\sqrt{2}} + \frac{1}{2\sqrt{2}} = \frac{\sqrt{3} + 1}{2\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} \\ &= \frac{\sqrt{6} + \sqrt{2}}{4} \end{aligned}$$

14) Answer: D

$$\begin{aligned} \frac{2 \tan 45^\circ}{1 + \cot 45^\circ} + \frac{1 + \cot 45^\circ}{\tan 45^\circ} &= \frac{2}{(1+1)} + \frac{(1+1)}{1} \\ &= 1 + 2 = 3 \end{aligned}$$

15) Ans: B

$$A = 60^\circ$$

$$B = 45^\circ$$

$$\sec (60^\circ - 45^\circ) = \frac{\sec 60^\circ \times \sec 45^\circ}{1 + \tan 60^\circ \tan 45^\circ}$$

$$\begin{aligned} \sec 15^\circ &= \frac{2 \times \sqrt{2}}{1 + \sqrt{3} \times 1} \\ &= \frac{2\sqrt{2}}{\sqrt{3}+1} \times \frac{(\sqrt{3}-1)}{(\sqrt{3}-1)} \\ &= \frac{2\sqrt{2}(\sqrt{3}-1)}{(\sqrt{3})^2 - (1)^2} \\ &= \frac{2\sqrt{6} - 2\sqrt{2}}{3-1} \\ &= \frac{2\sqrt{6} - 2\sqrt{2}}{2} = \frac{2(\sqrt{6} - \sqrt{2})}{2} \\ \sec 15^\circ &= \sqrt{6} - \sqrt{2} \end{aligned}$$

16) Answer: D

$$\frac{5 \sin^2 30^\circ + 4 \operatorname{cosec}^2 60^\circ - \tan^2 45^\circ}{\cos^2 30^\circ + \sin^2 30^\circ}$$

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$$\begin{aligned} \because \sin^2 \theta + \cos^2 \theta &= 1 \\ &= \frac{5 \times (\frac{1}{2})^2 + 4 \times (\frac{2}{\sqrt{3}})^2 - (1)^2}{1} \\ &= \frac{5 \times \frac{1}{4} + 4 \times \frac{4}{3} - 1}{1} \\ &= \frac{5}{4} + \frac{16}{3} - 1 \\ &= \frac{15 + 64 - 12}{12} = \frac{67}{12} \end{aligned}$$

17) **Answer: A**

$$\begin{aligned} \tan 405^\circ &= \tan (360^\circ + 45^\circ) \\ &= \tan 45^\circ \quad [\because \tan (360^\circ + \theta) = \tan \theta] \\ &= 1 \end{aligned}$$

18) **Answer: A**

$$\begin{aligned} \tan (1125^\circ) \\ &= \tan (3 \times 360^\circ + 45^\circ) \\ &= \tan 45^\circ [\because \tan (n \times 360^\circ + \theta) = \tan \theta] \\ &= 1 \end{aligned}$$

19) **Answer: A**

$$\begin{aligned} \sin \frac{7\pi}{4} \sin \frac{\pi}{4} \sin \frac{3\pi}{4} \sin \frac{5\pi}{4} \\ &= \sin \left(\pi + \frac{3\pi}{4} \right) \sin \frac{\pi}{4} \sin \frac{3\pi}{4} \sin \left(\pi + \frac{\pi}{4} \right) \\ &= \left(-\sin \frac{3\pi}{4} \right) \sin \frac{\pi}{4} \sin \frac{3\pi}{4} \left(-\sin \frac{\pi}{4} \right) \\ &= \sin \frac{3\pi}{4} \sin \frac{\pi}{4} \sin \frac{3\pi}{4} \sin \frac{\pi}{4} \\ &= \sin \left(\pi - \frac{\pi}{4} \right) \sin \frac{\pi}{4} \sin \left(\pi - \frac{\pi}{4} \right) \sin \frac{\pi}{4} \\ &= \sin \frac{\pi}{4} \sin \frac{\pi}{4} \sin \frac{\pi}{4} \sin \frac{\pi}{4} \\ &= \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} = \frac{1}{4} \end{aligned}$$

20) **Answer: A**

$$\cot^2 45^\circ - \cos^2 60^\circ = x \sin 45^\circ \cos 45^\circ \cot 30^\circ$$

$$1 - \left(\frac{1}{2} \right)^2 = x \times \frac{1}{\sqrt{2}} \cdot \frac{1}{\sqrt{2}} \cdot \sqrt{3}$$

$$\frac{3}{4} = \frac{x}{2} \times \sqrt{3}$$

$$x = \frac{3}{2\sqrt{3}} = \frac{\sqrt{3} \times \sqrt{3}}{2 \times \sqrt{3}} = \frac{\sqrt{3}}{2}$$

21) **Answer: B**

$$\begin{aligned} \tan^2 60^\circ - 2 \cot^2 45^\circ - \cot^2 30^\circ + 2 \sin^2 30^\circ + \\ \frac{3}{4} \sec^2 45^\circ \end{aligned}$$

$$= (\sqrt{3})^2 - 2 \times 1 - (\sqrt{3})^2 + 2 \left(\frac{1}{2} \right)^2 + \frac{3}{4} \times (\sqrt{2})^2$$

$$= 3 - 2 - 3 + 2 \times \frac{1}{4} + \frac{3}{4} \times 2$$

$$= 3 - 5 + \frac{1}{2} + \frac{3}{2}$$

$$= \frac{6 - 10 + 1 + 3}{2} = \frac{10 - 10}{2} = 0$$

22) **Answer: C**

$$\tan 18^\circ \tan 22^\circ \cot 60^\circ \tan 68^\circ \tan 72^\circ$$

$$\begin{aligned} &= \tan 18^\circ \cdot \tan 22^\circ \cot 60^\circ \tan (90^\circ - 22^\circ) \cdot \tan (90^\circ - 18^\circ) \\ &= \tan 18^\circ \cdot \tan 22^\circ \cot 60^\circ \cdot \cot 22^\circ \cdot \cot 18^\circ \end{aligned}$$

$$= \tan 18^\circ \times \frac{1}{\tan 18^\circ} \times \tan 22^\circ \times \frac{1}{\tan 22^\circ} \cdot \cot 60^\circ$$

$$= 1 \times 1 \times \cot 60^\circ$$

$$= 1 \times 1 \times \frac{1}{\sqrt{3}} \quad [\because \cot 60^\circ = \frac{1}{\sqrt{3}}]$$

$$= \frac{1}{\sqrt{3}}$$

23) **Answer: C**

$$\sin^2 60^\circ + \cos^2 30^\circ + \tan^2 45^\circ + \operatorname{cosec}^2 30^\circ$$

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$$\begin{aligned}
 &= \left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 + (1)^2 + (2)^2 \\
 &= \frac{3}{4} + \frac{3}{4} + 1 + 4 \\
 &= \frac{6}{4} + 5 = \frac{6+20}{4} = \frac{26}{4} = \frac{13}{2}
 \end{aligned}$$

24) Ans: A

Sum of all six trigonometric ratios

$$\begin{aligned}
 &= \sin \beta + \cos \beta + \tan \beta + \cot \beta + \sec \beta + \operatorname{cosec} \beta \\
 &= \sin 45^\circ + \cos 45^\circ + \tan 45^\circ + \cot 45^\circ + \sec 45^\circ + \operatorname{cosec} 45^\circ
 \end{aligned}$$

$$= \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} + 1 + 1 + \sqrt{2} + \sqrt{2}$$

$$= \frac{2}{\sqrt{2}} + 2 + 2\sqrt{2}$$

$$= \sqrt{2} + 2 + 2\sqrt{2}$$

$$= 3\sqrt{2} + 2 = 2 + 3\sqrt{2}$$

25) Answer: B

$$\tan 26^\circ \cdot \tan 48^\circ \cdot \tan 42^\circ \cdot \tan 64^\circ$$

$$= \tan 26^\circ \cdot \tan 48^\circ \cdot \tan (90^\circ - 48^\circ) \cdot \tan (90^\circ - 26^\circ)$$

$$= \tan 26^\circ \cdot \tan 48^\circ \cdot \cot 48^\circ \cdot \cot 26^\circ$$

$$\{\because \tan (90^\circ - \theta) = \cot \theta\}$$

$$= 1$$

26) Answer: D

Given

$$\sec A = 13/12 = \text{hypotenuse/base}$$

$$\therefore (\text{Perpendicular})^2 = (\text{hypotenuse})^2 - (\text{base})^2$$

$$= (13)^2 - (12)^2$$

$$= 25$$

$$\text{So, Perpendicular} = \sqrt{25} = 5$$

$$\therefore \sin A(1 - \tan A) = \frac{5}{13} \left(1 - \frac{5}{12}\right) \left\{ \because \sin \theta = \frac{\text{Perpendicular}}{\text{hypotenuse}} \right\}$$

$$\frac{\text{Perpendicular}}{\text{hypotenuse}} \tan \theta = \frac{\text{Perpendicular}}{\text{base}}$$

$$= \frac{5}{13} \times \frac{7}{12} = \frac{35}{156}$$

27) Answer: B

$$\frac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta}$$

Dividing by $\cos \theta$,

$$= \frac{1 - \tan \theta}{1 + \tan \theta} \quad \left[\because \tan \theta = \frac{b}{a} \right]$$

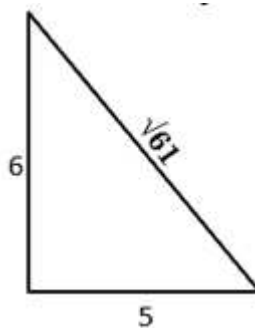
$$= \frac{1 - \frac{b}{a}}{1 + \frac{b}{a}}$$

$$= \frac{a-b}{a+b}$$

28) Answer: B

$$\cot \theta = \frac{5}{6}$$

$$\frac{12 \cos \theta - 5 \sin \theta}{12 \cos \theta + 5 \sin \theta} = ?$$



$$\cot \theta = \frac{5}{6} = \text{base / Perpendicular}$$

$$\text{So, base} = 5$$

$$\text{Perpendicular} = 6$$

$$\text{Hypotenuse} = \sqrt{5^2 + 6^2} = \sqrt{61}$$

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$$\cos \theta = \frac{5}{\sqrt{61}}, \sin \theta = \frac{6}{\sqrt{61}}$$

So,

$$\frac{12\cos \theta - 5\sin \theta}{12\cos \theta + 5\sin \theta}$$

$$\Rightarrow \frac{12 \times \frac{5}{\sqrt{61}} - 5 \times \frac{6}{\sqrt{61}}}{12 \times \frac{5}{\sqrt{61}} + 5 \times \frac{6}{\sqrt{61}}}$$

$$\Rightarrow \frac{\frac{60-30}{\sqrt{61}}}{\frac{60+30}{\sqrt{61}}}$$

$$\Rightarrow \frac{\frac{30}{\sqrt{61}}}{\frac{90}{\sqrt{61}}} = \frac{30}{\sqrt{61}} \times \frac{\sqrt{61}}{90}$$

$$= \frac{1}{3}$$

29)Ans: D

$$\sin \theta = \frac{4}{5}, \cos \theta = \sqrt{1 - \sin^2 \theta} = \sqrt{1 - \left(\frac{4}{5}\right)^2} = \sqrt{\frac{9}{25}} = \frac{3}{5}$$

$$\sin \theta + \cos \theta$$

$$= \frac{4}{5} + \frac{3}{5} = 1\frac{2}{5}$$

30)Answer: A

$$\cot A = \frac{8}{15}$$

$$\text{So, } \tan A = \frac{15}{8}$$

$$\cot B = \frac{24}{7}$$

$$\tan B = \frac{7}{24}$$

$$\tan (A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$= \frac{\frac{15}{8} - \frac{7}{24}}{1 + \frac{15}{8} \times \frac{7}{24}}$$

$$= \frac{\frac{45-7}{24}}{\frac{192+105}{8 \times 24}} = \frac{38 \times 8}{297} = \frac{304}{297}$$

31)Answer: B

Given:

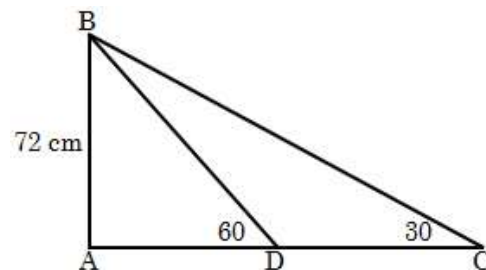
$$4\cot \theta = 5 \Rightarrow \cot \theta = \frac{5}{4} \Rightarrow \tan \theta = \frac{4}{5}$$

$$\frac{3\sin \theta - 2\cos \theta}{2\sin \theta + 3\cos \theta}$$

$$= \frac{3\left(\frac{\sin \theta}{\cos \theta}\right) - 2\left(\frac{\cos \theta}{\cos \theta}\right)}{2\left(\frac{\sin \theta}{\cos \theta}\right) + 3\left(\frac{\cos \theta}{\cos \theta}\right)} \quad (\text{Dividing numerator and denominator by } \cos \theta)$$

$$= \frac{3\tan \theta - 2 \times 1}{2\tan \theta + 3} = \frac{3 \times \frac{4}{5} - 2}{2 \times \frac{4}{5} + 3} = \frac{\frac{12-10}{5}}{\frac{8+15}{5}} = \frac{2}{23}$$

32) Answer: C



ΔABC -

$$\tan 30^\circ = \frac{AB}{AC}$$

$$\tan 30^\circ = \frac{72}{AC}$$

$$AC = 72 \times \sqrt{3}$$

ΔABD -

$$\tan 60^\circ = \frac{AB}{AD} = \frac{72}{AD}$$

$$AD = \frac{72}{\sqrt{3}} \dots\dots\dots(ii)$$

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From equation. (i) and (ii) -

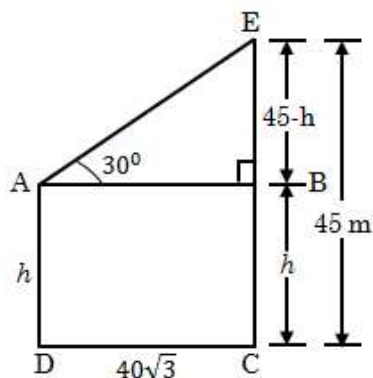
$$\frac{72}{\sqrt{3}} + DC = 72\sqrt{3}$$

$$DC = 72\left(\sqrt{3} - \frac{1}{\sqrt{3}}\right)$$

$$= 72 \times \frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 48\sqrt{3} \text{ meter}$$

33)Ans: B

Given the height of the tower is $EC = 45 \text{ m}$.



$$\angle EAB = 30^\circ$$

Horizontal distance $DC = 40\sqrt{3} \text{ meter} = AB \text{ meter}$

Let, height of the house is h meters.

$\therefore \triangle ABE$ -

$$\tan 30^\circ = \frac{EB}{AB}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{45 - h}{40\sqrt{3}}$$

$$45 - h = 40$$

$$h = 5 \text{ meter}$$

34) Answer: D

$$\sin A = \frac{4}{5} = \frac{\text{perpendicular}}{\text{hypotenuse}}$$

$$\therefore \text{Base} = \sqrt{\text{hypotenuse}^2 - \text{perpendicular}^2}$$

$$= \sqrt{(5)^2 - (4)^2}$$

$$= \sqrt{25 - 16}$$

$$= \sqrt{9}$$

$$= 3$$

By question

$$\tan A + \cos A$$

$$= \frac{\text{perpendicular}}{\text{Base}} + \frac{\text{Base}}{\text{hypotenuse}}$$

$$= \frac{4}{3} + \frac{3}{5}$$

$$= \frac{20+9}{15}$$

$$= \frac{29}{15}$$

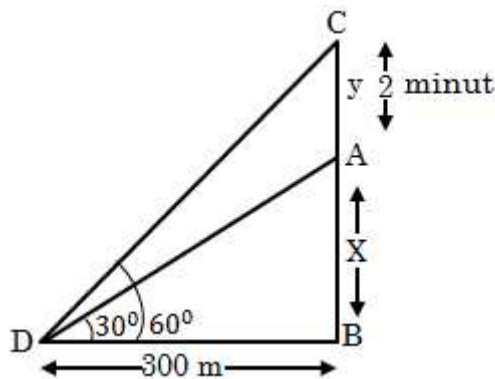
35)Answer: C

$$A + B = 90^\circ$$

$$B = 90^\circ - A$$

$$\text{So, } \cos B = \cos (90^\circ - A) = \sin A = \frac{1}{3}$$

36)Ans: D



Suppose the position of the airplane changes from A to C in 2 minutes.

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ΔABD ,

$$\tan 30^\circ = \frac{x}{300}$$

$$\frac{1}{\sqrt{3}} = \frac{x}{300}$$

$$x = \frac{300}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 100\sqrt{3} \text{ meter}$$

In ΔCBD ,

$$\tan 60^\circ = \frac{x+y}{300}$$

$$\sqrt{3} = \frac{x+y}{300}$$

$$x + y = 300\sqrt{3}$$

$$100\sqrt{3} + y = 300\sqrt{3}$$

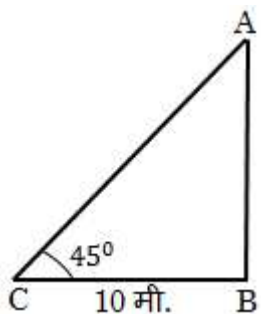
$$y = 200\sqrt{3}$$

$$\therefore \text{Airplane speed} = \frac{y}{t} = \frac{200\sqrt{3}}{2 \times 60} = \frac{5}{3}\sqrt{3}$$

$$= \frac{5 \times 1.732}{3} = 5 \times 0.577 = 2.885$$

$$= 2.9 \text{ m/s}$$

37)Ans: A



As in figure-

Ladder height = AC

In ΔABC ,

$$\cos 45^\circ = \frac{BC}{AC}$$

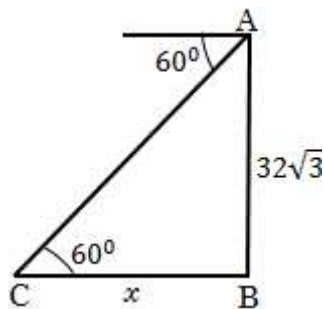
$$\frac{1}{\sqrt{2}} = \frac{10}{AC}$$

$$AC = 10\sqrt{2} \text{ meter}$$

38) Ans: A

Height of tower = AB = $32\sqrt{3}$ meter

Let, the distance of the building from the considered tower is x m.



$$\tan 60^\circ = \frac{AB}{CB}$$

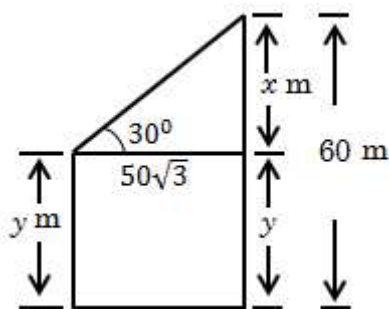
$$\sqrt{3} = \frac{32\sqrt{3}}{x}$$

$$x = 32 \text{ meter}$$

39) Answer: B

Let, height of house = y meter

According to question,



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$$\tan 30^\circ = \frac{x}{50\sqrt{3}}$$

$$\frac{1}{\sqrt{3}} = \frac{x}{50\sqrt{3}}$$

$$x = 50 \text{ meter}$$

$$\therefore x + y = 60$$

$$y = 60 - x$$

$$y = 60 - 50$$

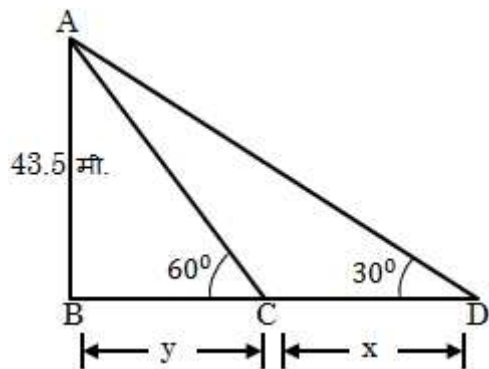
$$y = 10 \text{ m.}$$

40) Answer: B

The initial distance of the car from the tower = y m.

And distance after change of location = x m.

Tower height (AB) = 43.5 m



In $\triangle ABC$,

$$\tan 60 = \frac{AB}{BC}$$

$$\sqrt{3} = \frac{43.5}{y}$$

$$y = \frac{43.5}{\sqrt{3}}$$

$$\boxed{3y = 43.5\sqrt{3}} \dots\dots\dots(i)$$

In, $\triangle ABD$,

$$\tan 30 = \frac{AB}{BD}$$

$$\frac{1}{\sqrt{3}} = \frac{43.5}{x+y}$$

$$\boxed{x + y = 43.5\sqrt{3}} \dots\dots\dots(ii)$$

Putting this value in equation (ii) -

$$x + y = 3y$$

$$x = 2y$$

$$y = \frac{x}{2}$$

Putting value of y in equation(ii) -

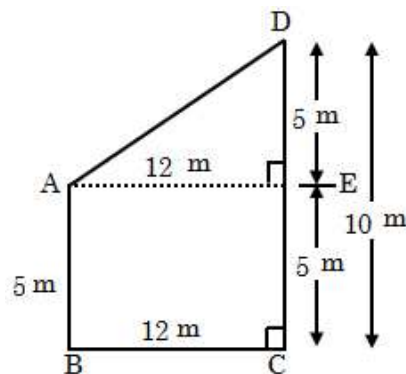
$$3 \times \frac{x}{2} = 43.5\sqrt{3}$$

$$x = \frac{43.5\sqrt{3} \times 2}{3}$$

$$x = \frac{87\sqrt{3}}{3}$$

$$= 29\sqrt{3} \text{ meter}$$

41) Answer: C



Distance between top of houses = AD

$$AE = BC = 12$$

$$DE = CD - CE = 10 - 5 = 5 \text{ meter}$$

In $\triangle AED$, by Pythagoras theorem -

$$AD^2 = AE^2 + DE^2$$

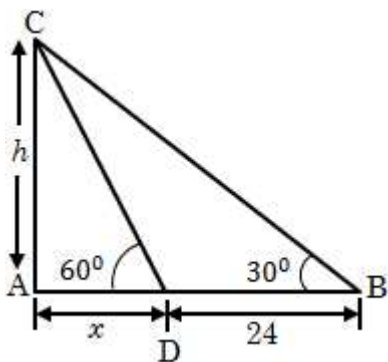
$$= (12)^2 + (5)^2 = 144 + 25$$

$$AD^2 = 169$$

$$\Rightarrow AD = 13 \text{ meter}$$

42) Answer: D

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$$\tan 30^\circ = \frac{h}{x+24}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{x+24}$$

$$\sqrt{3}h = x + 24 \dots\dots\dots(\text{I})$$

$$\tan 60^\circ = \frac{h}{x}$$

$$\sqrt{3} = \frac{h}{x}$$

$$h = \sqrt{3}x \dots\dots\dots(\text{II})$$

Putting the value of h in equation (i),

$$\sqrt{3} \times \sqrt{3}x = x + 24$$

$$3x = x + 24$$

$$2x = 24$$

$$x = 12$$

$$\sqrt{3} = \frac{h}{12}$$

$$h = 12\sqrt{3}\text{m}$$

43) Answer: B

$$\cos \theta + \sin \theta = p \dots\dots\dots(\text{i})$$

And

$$\sec \theta + \operatorname{cosec} \theta = q$$

$$\frac{1}{\cos \theta} + \frac{1}{\sin \theta} = q$$

$$\Rightarrow \frac{\sin \theta + \cos \theta}{\cos \theta \sin \theta} = q$$

$$\Rightarrow \frac{p}{\cos \theta \sin \theta} = q(\sin \theta + \cos \theta = p) \text{ From equation (i)}$$

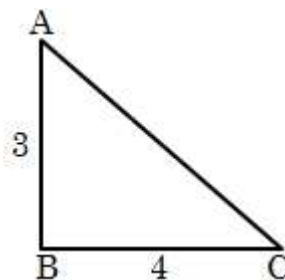
$$\Rightarrow \frac{p}{q} = \sin \theta \cos \theta$$

44) Answer: B

Given,

$$4\sin \theta - 3\cos \theta = 0$$

$$4\sin \theta = 3\cos \theta$$



$$\frac{\sin \theta}{\cos \theta} = \frac{3}{4}$$

$$\tan \theta = \frac{3}{4} = \frac{\text{Perpendicular}}{\text{Base}}$$

From the Pythagoras theorem –

$$(\text{Hypotenuse})^2 = (\text{Perpendicular})^2 + (\text{Base})^2$$

$$(AC)^2 = 3^2 + 4^2$$

$$= 9 + 16 = 25$$

$$AC(\text{Hypotenuse}) = \sqrt{25} = 5$$

$$\sec \theta \cdot \operatorname{cosec} \theta = \frac{\text{Hypotenuse}}{\text{Base}} \times \frac{\text{Hypotenuse}}{\text{Perpendicular}}$$

$$= \frac{5}{4} \times \frac{5}{3}$$

$$\sec \theta \cdot \operatorname{cosec} \theta = \frac{25}{12}$$

45) Answer: D

$$\cot 52^\circ = b$$

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$$\cot(90^\circ - 38^\circ) = \tan 38^\circ = b$$

46) Answer: C

$$\frac{\sin 23^\circ}{\cos 67^\circ} = \frac{\sin 23^\circ}{\cos(90-23)^\circ} = \frac{\sin 23^\circ}{\sin 23^\circ} = 1$$

47) Answer: C

$$\Rightarrow \sin 120^\circ \sin 240^\circ \sin 270^\circ$$

$$\Rightarrow \sin(90^\circ + 30^\circ) \sin(180^\circ + 60^\circ) \sin(180^\circ + 90^\circ)$$

$$\Rightarrow \cos 30^\circ (-\sin 60^\circ) (-\sin 90^\circ)$$

$$\Rightarrow \frac{\sqrt{3}}{2} \times \left(-\frac{\sqrt{3}}{2}\right) \times (-1) = \frac{3}{4}$$

48) Answer: C

$$\text{If, } 0^\circ < \theta \leq 90^\circ$$

$$\cos^2 \theta - 3\cos \theta + 2 = 2\sin^2 \theta$$

$$\cos^2 \theta - 3\cos \theta + 2 = 2(1 - \cos^2 \theta)$$

$$\cos^2 \theta - 3\cos \theta + 2 = 2 - 2\cos^2 \theta$$

$$3\cos^2 \theta = 3\cos \theta$$

$$3\cos^2 \theta - 3\cos \theta = 0$$

$$\cos^2 \theta - \cos \theta = 0$$

$$\cos \theta (\cos \theta - 1) = 0$$

$$\text{If, } \cos \theta = 0^\circ = \cos 90^\circ$$

$$\text{then } \theta = 90^\circ$$

$$\text{If, } \cos \theta = 1 = \cos 0^\circ$$

$$\theta = 0^\circ$$

49) Answer: B

$$\frac{\cos \theta}{1 + \sin \theta}$$

Multiply by $(1 - \sin \theta)$ in numerator and denominator,

$$= \frac{(1 - \sin \theta) \times \cos \theta}{\cos^2 \theta} = (\sec \theta - \tan \theta)$$

50) Answer: D

$$x = a \sec \theta + b \tan \theta \text{ and } y = a \tan \theta + b \sec \theta$$

$$x^2 - y^2 = ?$$

$$\begin{aligned} x^2 - y^2 &= (a \sec \theta + b \tan \theta)^2 - (a \tan \theta + b \sec \theta)^2 \\ &= a^2 \sec^2 \theta + b^2 \tan^2 \theta + 2ab \sec \theta \tan \theta - a^2 \tan^2 \theta - b^2 \sec^2 \theta - 2ab \sec \theta \tan \theta \end{aligned}$$

$$= a^2 \sec^2 \theta + b^2 \tan^2 \theta - a^2 \tan^2 \theta - b^2 \sec^2 \theta$$

$$= a^2 (\sec^2 \theta - \tan^2 \theta) - b^2 (\sec^2 \theta - \tan^2 \theta)$$

$$x^2 - y^2 = (a^2 - b^2) (\sec^2 \theta - \tan^2 \theta)$$

$$x^2 - y^2 = a^2 - b^2 \{ \sec^2 \theta - \tan^2 \theta = 1 \}$$

Geometry

1) All four angles of a quadrilateral are equal. Find their measurement.

- a) 100°
- b) 85°
- c) 65°
- d) 90°

2) The diagonals of a quadrilateral are 25° inclined on one side of the quadrilateral. The acute angle formed between the diagonals is –

- a) 30°
- b) 50°
- c) 45°
- d) 35°

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3) The ratio of the four angles of a quadrilateral is 1: 2: 4: 5. What will be the value of smallest angle?

- a) 39°
- b) 30°
- c) 45°
- d) 36°

4) The values of two adjacent angles of a quadrilateral are 135° and 45° and the other two angles are equal. Find the value of equal angles.

- a) 90°
- b) 100°
- c) 135°
- d) 80°

5) If one of the acute angle of a right angle triangle is 55° , what will be the value of the other acute angle?

- a) 55°
- b) 40°
- c) 45°
- d) 35°

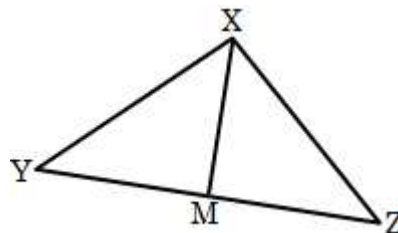
6) ABC is a right angle triangle whose angle A is right angle. Which side needs to bisect to form two other right-angled triangles?

- a) AB
- b) CA
- c) BC
- d) None of these

7) Which of the following will be the sides of the right angled triangle?

- a) 84 cm, 13 cm, 85 cm
- b) 88 cm, 63 cm, 115 cm
- c) 16 cm, 112 cm, 111 cm
- d) 86 cm, 100 cm, 57 cm

8) In the diagram, M is the midpoint of YZ, $\angle XMZ = 32^\circ$ and $\angle XYZ = 16^\circ$, the measure of $\angle XZY$ is-



- a) 64°
- b) 61°
- c) 74°
- d) 78°

9) Each side of a square park is 2500 cm. And there are 220cm wide two paths passing through its center. How much does it cost to lay gravel on the paths at a cost of Rs4/decemeter²?

- a) Rs.42064
- b) Rs.45110
- c) Rs. 10516
- d) Rs. 10516

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10) The ratio of the length and width of a rectangle is 3:1. If its perimeter is 72m, what will be the length of the rectangle?

- a) 18m
- b) 32m
- c) 27m
- d) 22m

11) The dimensions of a rectangular plot of land are 3700cm and 2300cm. What is the perimeter of the rectangle?

- a) 98 meter
- b) 161 meter
- c) 86meter
- d) 120 meter

12) The length of a rectangular plot is 5 m more than its width. If the perimeter of the plot is 102 m, find the dimensions of the plot.

- a) Length is 28 m and width is 23 m.
- b) Length is 29 m and width is 24 m.
- c) Length is 24 m and width is 29 m.
- d) Length is 33 m and width is 28 m.

13) In a rectangle Length: width = 4: 3. Find the value of (width : diagonal)

- a) 5: 7
- b) 4: 3
- c) 3: 5

d) 2: 5

14) A parallelogram PQRS with lengths of sides 16 cm and 24 cm has a diagonal 20 cm long. The length of the second diagonal is approximately:

- a) 36 cm
- b) 35.6 cm
- c) 34 cm
- d) 35 cm

15) If in a trapezium ABCD, E and F are the midpoints of the two non-parallel sides AB and CD, then FE =?

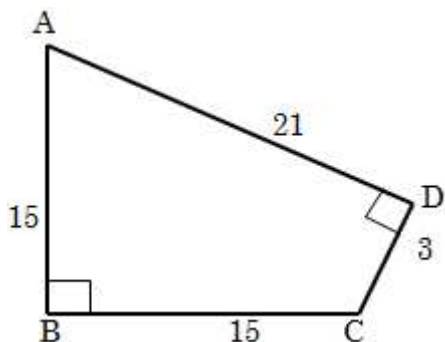
- a) $\frac{2}{3}(AB-CD)$
- b) $\frac{1}{2}(AD+BC)$
- c) $\frac{\sqrt{3}}{2}(AB+CD)$
- d) $\sqrt{3}(AB+CD)$

16) The smaller side of the parallelogram is 16cm and the larger side is 1.5 times the smaller side. Find the perimeter of a parallelogram.

- a) 75 cm
- b) 66 cm
- c) 80 cm
- d) 78 cm

17) Find the area of the quadrilateral shown in the following figure in which $\angle B = \angle D = 90^\circ$.

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- a) 144 square unit
- b) 154 square unit
- c) 163 square unit
- d) 223 square unit

18) The length of one side of rhombus is 34 cm and the length of one diagonal is 32 cm. Find the length of the another diagonal.

- a) 40 cm
- b) 64 cm
- c) 60 cm
- d) 32 cm

19) The length of the side of rhombus is $2\sqrt{5}$ cm and its area is 16 cm. What will be the sum of the lengths of its diagonals?

- a) 15 cm
- b) 12cm
- c) 18 cm
- d) 17 cm

20.

20) The length of one side of a rhombus is 13 cm and the length of one diagonal is 24 cm. Then what will be the length of the second diagonal?

- a) 12cm
- b) 10cm
- c) 12.5cm
- d) 11cm

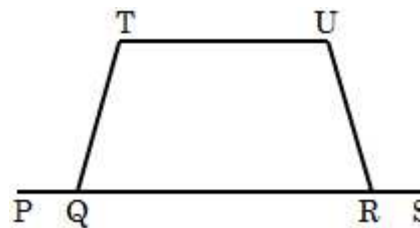
21.

21) The diagonals of a rhombus are 8 cm and 6 cm. What is the perimeter of rhombus?

- a) 28 cm
- b) 10 cm
- c) 14cm
- d) 20cm

22.

22) In the figure below, $TU \parallel PS$ and point Q and R, is on PS. $\angle PQT = y^\circ$, $\angle RQT = (y - 50)^\circ$ and $\angle TUR = (y + 25)^\circ$. Find the value of $\angle URS$.



- a) 135°
- b) 140°
- c) 130°
- d) 138°

23. Trapezium is a quadrilateral which has

- a) All sides are equal

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- b) The opposite sides are the same
c) There are two pairs of parallel opposite sides.

d) A pair of parallel opposite sides

24. The order of rotational symmetry of a trapezium is.

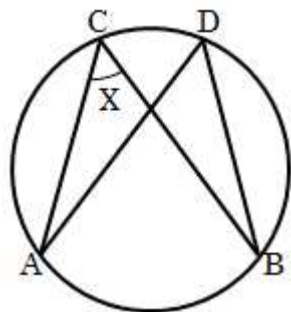
- a) 2
b) 0
c) 1
d) 3

25. Which of the following information is sufficient to answer the question-?

What is the value of $\angle ACB$?

Information:

(1)

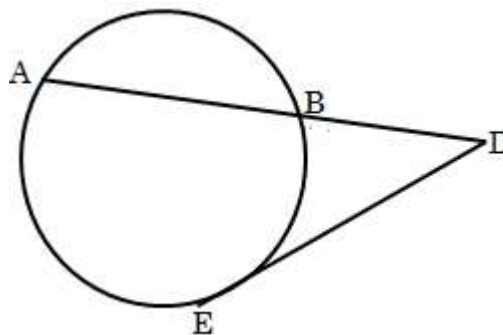


(2) $\angle D = 60^\circ$

- a) Either 1 or 2 is sufficient.
b) Both 1 and 2 are sufficient.
c) Only 2 is sufficient
d) Only 1 is sufficient

26.

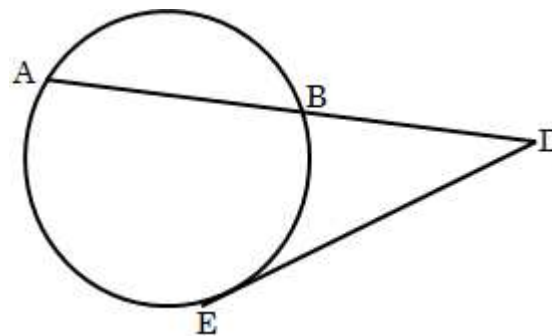
26. In the circle below, chord \overline{AB} is extended to meet the tangent line \overline{DE} at the D point. If $\overline{AB} = 8$ cm and $\overline{DE} = 3$ cm, find the length of \overline{BD} .



- a) 1 cm
b) $2\sqrt{6}$ cm
c) 2.5 cm
d) 3 cm

27.

27. In the circle given below, chord \overline{AB} is extended to join at point D with tangent \overline{DE} . If $\overline{AB} = 16$ cm and $\overline{BD} = 12$ cm, find the length of \overline{DE} .



- a) $4\sqrt{12}$ cm
b) 18.33 cm
c) 14.5 cm

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d) 15.66 cm

28. The number of diagonals in a 27 sided polygon is-

a) 220

b) 324

c) 332

d) 245

29. The sum of all interior angles of a polygon is 1260° . Find the number of sides of the polygon.

a) 9

b) 8

c) 10

d) 11

30. If two supplementary angles are in the ratio of 4: 5, find the larger angle.

a) 90°

b) 120°

c) 140°

d) 100°

31. If two supplementary angles are in the ratio 13: 5, find the difference between them.

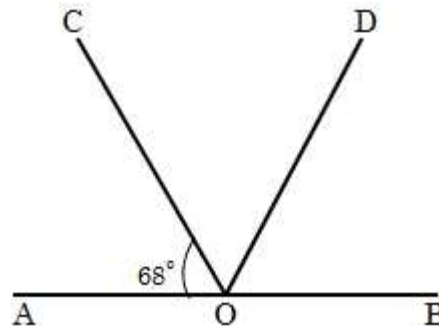
a) 40°

b) 65°

c) 80°

d) 90°

32. In the given figure, AOB is a straight line, $\angle AOC = 68^\circ$ and bisector of $\angle BOC$ is OD. What is the value of $\angle BOD$ in degrees?



a) 56°

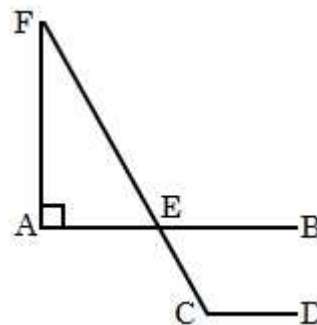
b) 54°

c) 53°

d) 55°

33.

33. In figure, $AB \parallel CD$ and $\angle AFE = 30^\circ$, Find the value of $\angle FCD$.



a) 80°

b) 120°

c) 115°

d) 40°

34.

34. What will be sum of the interior angles of a regular octagon?

a) 1080°

b) 1020°

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c) 756°

d) 1050°

35. What will be the measure of each interior angle of a common pentagon?

a) 120°

b) 98°

c) 108°

d) 90°

36. What is the number of diagonals in a 19 side's polygon?

a) 200

b) 212

c) 152

d) 176

37. The supplementary angle of an angle is 35° more than three times of its complementary angle. What will be the value of the angle?

a) 57.5°

b) 72.5°

c) 62.5°

d) 65°

38. If two complementary angles are in the ratio 11:7, find the smaller angle.

a) 35°

b) 56°

c) 46°

d) 55°

39.

39. Each internal angle of an equilateral polygon is 150 degrees. This polygon is a

a) Octagon

b) Decagon

c) Dodecagon

d) Heptagon

40. Each interior angle of an equilateral polygon is 108° more than its exterior angle. Find the number of sides of this polygon.

a) 4

b) 10

c) 8

d) 5

41.

41. The sum of the interior angles of an equilateral polygon is 1980° . How many sides does this polygon have?

a) 12

b) 16

c) 13

d) 14

42.

42. Find the value of the angle that is $1/8$ of its supplementary angle?

a) 35°

b) 20°

c) 40°

d) 55°

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43. $\triangle ABC$ is similar to $\triangle PQR$ and their perimeters are 36cm and 24cm, respectively. If $PQ = 10$ cm then find the value of AB .

- (a) 15cm
- (b) 16cm
- (c) 20cm
- (d) 18cm

44. The largest chord of the circle is-

- a) Radius
- b) Diameter
- c) Line segment
- d) Segment

45. The order of rotational symmetry of a parallelogram is:

- a) 3
- b) 1
- c) 2
- d) 4

46. In a semicircle, A and C denote the diameter ends and B is a point on the semicircle. So the angle ABC will always be:

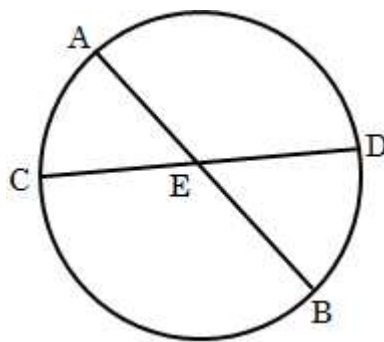
- a) Cannot be determined
- b) Acute angle
- c) Obtuse angle
- d) Right angle

47. The area of the circumcircle of a right angled triangle with sides 3cm, 4cm and 5cm will be.....

- a) $3.16 \pi \text{ cm}^2$
- b) $6.25 \pi \text{ cm}^2$
- c) $24 \pi \text{ cm}^2$
- d) $4.9 \pi \text{ cm}^2$

48.

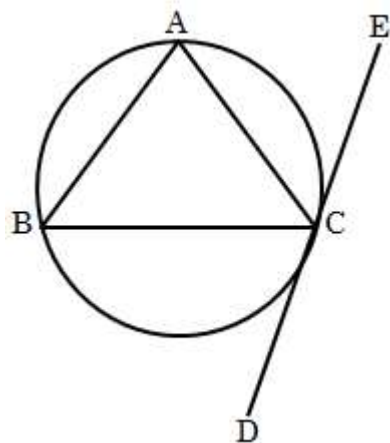
48. In circle below, $m \overline{AE} = 8$ cm, $m \overline{BE} = 30$ cm and $m \overline{CE} = 5$ cm. Find the value of $m \overline{DE}$.



- a) 33 cm
- b) 40 cm
- c) 48 cm
- d) 60cm

49. If $\angle BCD = 78^\circ$, what will be the value of $\angle BAC$?

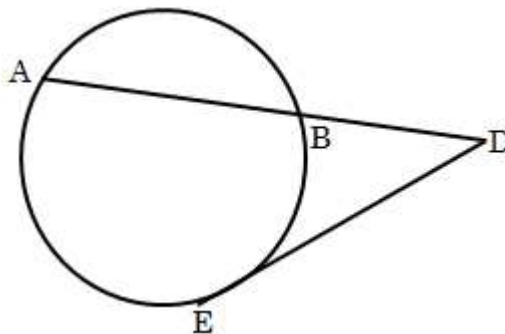
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- a) 81°
- b) 87°
- c) 73°
- d) 78°

50.

50. In the circle given below, chord AB is extended to point D to match the tangent DE. If $AB = 18$ cm and $BD = 6$ cm, then find the length of DE?



- a) 8 cm
- b) $\sqrt{27}$ cm
- c) 12 cm
- d) 10 cm

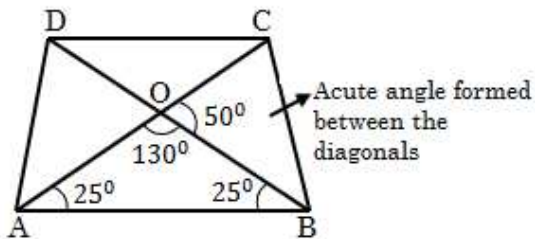
Geometry – Answers and Explanation

1) Answer: D

Sum of four angles of a quadrilateral = 360°

\therefore Each angle = $360^\circ / 4 = 90^\circ$

2) Answer: B



In $\triangle AOB$

$\angle A + \angle B + \angle O = 180^\circ$

$25 + 25 + \angle O = 180^\circ$

Obtuse angle ($\angle O$) = $180^\circ - 50^\circ = 130^\circ$

Acute angle ($\angle COB$) = $180^\circ - 130^\circ = 50^\circ$

3) Answer: B

Let the four interior angles of the quadrilateral be x , $2x$, $4x$, $5x$ respectively.

The sum of all the four angles of a quadrilateral = 360°

$x + 2x + 4x + 5x = 360^\circ$

$12x = 360^\circ$

$x = 30^\circ$

Hence the smallest angle = $x = 30^\circ$

4) Answer: A

\therefore Sum of all the angles of a quadrilateral = 360°

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Two adjacent angles of quadrilateral are 135° and 45° and the remaining two angles are equal.

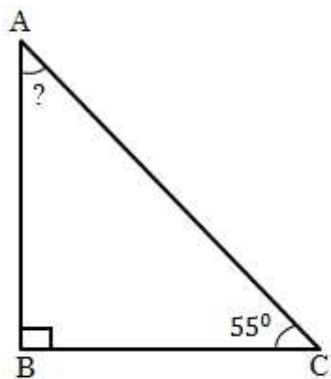
Let x be the angle.

$$\therefore 135^\circ + 45^\circ + x^\circ + x^\circ = 360^\circ$$

$$2x^\circ = 360^\circ - 180^\circ$$

$$x^\circ = 90$$

5) Answer: D



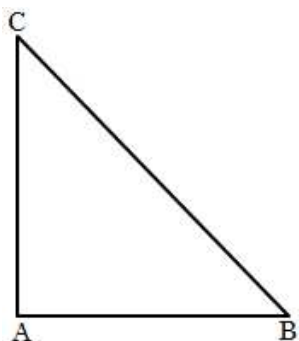
$$180^\circ = \angle A + \angle B + \angle C$$

$$180^\circ = \angle A + 90^\circ + 55^\circ$$

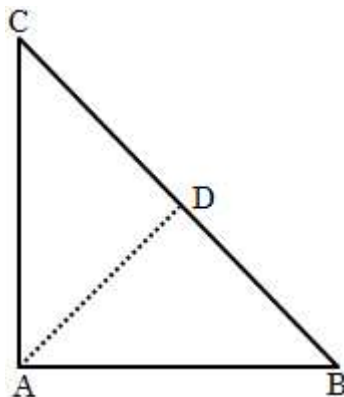
$$180^\circ - 145^\circ = \angle A$$

$$\angle A = 35^\circ$$

6) Answer: C



On bisecting the BC—



Right triangle = $\triangle ADB$, $\triangle ADC$

ABC is a right angled triangle whose angle A is right angled. For the creation of two other right-angled triangles, the side BC will have to bisect.

7) Answer: A

From the Pythagoras theorem,

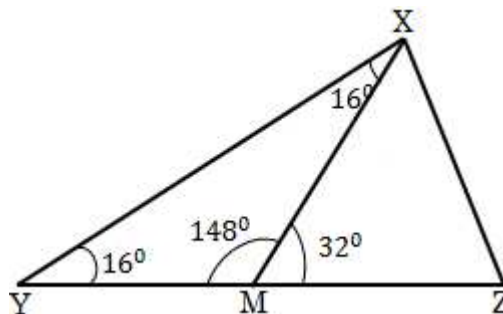
$$(85)^2 = (13)^2 + (84)^2$$

$$7225 = 169 + 7056$$

$$7225 = 7225$$

The sides of right angle Δ will be 85, 84 and 13.

8) Answer: C



$$\angle XMY = 180^\circ - 32^\circ = 148^\circ$$

$$\text{Then } \angle YXM = 180^\circ - (148 + 16)^\circ = 16^\circ$$

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$YM = XM$ and $XM = MZ$, as M is the mid point of YZ.

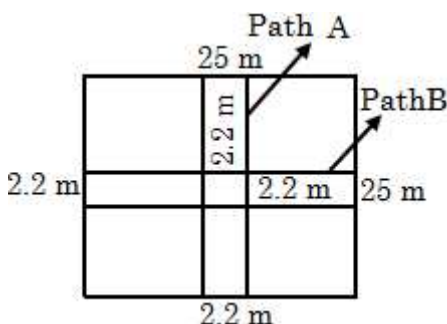
so, $XM = MZ$

So, $\angle MXZ = \angle XZM$

$$\angle XZM + \angle XZM = 180^\circ - 32^\circ$$

$$\angle XZM = 148^\circ / 2 = 74^\circ$$

9) Answer: A



$$\text{Area of path A} = 25 \times 2.2 = 55 \text{ m}^2$$

$$\text{Area of path B} = 25 \times 2.2 = 55 \text{ m}^2$$

$$\text{Total route area} = 25 \times 2.2 + 25 \times 2.2 - 2.2 \times 2.2$$

$$= 55 + 55 - 4.84 = 105.16 \text{ m}^2 = 10516 \text{ decemeter}^2$$

$$\text{Total cost} = 10516 \times 4 = \text{Rs. } 42064$$

10) Answer: C

Let the length of the rectangle be $3x$ m and width x m.

$$\text{Perimeter of Rectangle (P)} = 2[l+b]$$

$$72 = 2[3x+x]$$

$$72 = 6x + 2x$$

$$72 = 8x$$

$$x = 72/8$$

$$x = 9$$

$$\text{Rectangle length} = 3 \times 9$$

$$= 27 \text{ m}$$

11) Answer: D

Given have-

Rectangle length = 37 m

Rectangle width = 23 m

Perimeter of rectangle = 2 (length + width)

$$= 2(37+23)$$

$$= 120 \text{ meter}$$

12) Answer: A

Let the length of a rectangular plot be l m and width b m.

$$\therefore \text{Perimeter of rectangular plot} = 2(l+b)$$

According to question,

$$\therefore l = b + 5$$

$$\therefore 2(l+b) = 102$$

$$\Rightarrow 2(b+5+b) = 102$$

$$\Rightarrow (2b+5) = 51$$

$$\Rightarrow 2b = 51 - 5$$

$$\Rightarrow 2b = 46$$

$$\Rightarrow b = 23 \text{ m}$$

$$l = 23 + 5 = 28 \text{ m}$$

Hence, the length will be 28 meters and width will be 23 meters.

13) Answer: C

Let the length of rectangle = $4x$

And the width of rectangle = $3x$

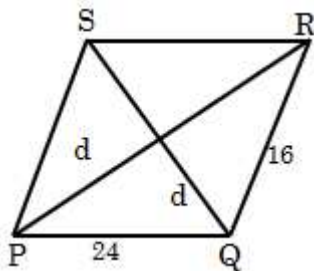
$$\therefore \text{Diagonal of rectangle} = \sqrt{(4x)^2 + (3x)^2} = 5x$$

$$\therefore \text{Width: Diagonal} = 3x : 5x = 3:5$$

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14) Answer: B

The adjacent sides of a parallelogram are a and b and the diagonals are d_1 , and d_2 .



$$d_1^2 + d_2^2 = 2(a^2 + b^2)$$

Given- $a = 24$ cm, $b = 16$ cm, $d_1 = 20$ cm

$$\therefore d_2^2 = 2(24^2 + 16^2) - 20^2$$

$$= 2 \times (576 + 256) - 400$$

$$= 2 \times 832 - 400$$

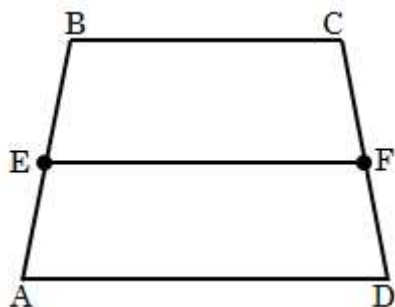
$$= 1664 - 400$$

$$= 1264$$

$$\therefore d_2 = \sqrt{1264} = 35.6 \text{ cm}$$

15) Answer: B

In any trapezium, the line joining midpoint of non-parallel sides is parallel to the parallel sides of trapezoid and half of their sum in length.



$$FE = 1/2(AD + BC)$$

16) Answer: C

Smaller side of parallelogram = 16 cm

Larger side of parallelogram = $16 \times 1.5 = 24$ cm

Hence the perimeter of a parallelogram = $2(\text{smaller side} + \text{larger side})$

$$= 2 \times (16 + 24)$$

$$= 2 \times 40$$

$$= 80 \text{ cm}$$

17) Answer: A

Area of quadrilateral ABCD = area of $\triangle ABC$ + area of $\triangle ADC$

$$1/2 \times AB \times BC + 1/2 \times CD \times DA$$

$$(1/2 \times 15 \times 15 + 1/2 \times 3 \times 21)$$

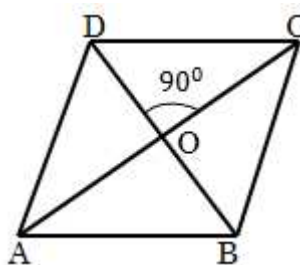
$$= 1/2(15 \times 15 + 3 \times 21)$$

$$= 1/2(225 + 63)$$

$$= 288/2$$

$$= 144 \text{ square unit}$$

18) Answer: C



sides of rhombus = 34 cm

A diagonal AC = 32 cm

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$$\therefore AO = OC, BO = OD$$

$$\therefore AO = OC = AC/2 = 16 \text{ cm}$$

$$\Delta AOB \text{ में, } AB^2 = AO^2 + BO^2$$

$$BO = \sqrt{AB^2 - AO^2}$$

$$= \sqrt{(34)^2 - (16)^2}$$

$$= \sqrt{1156 - 256}$$

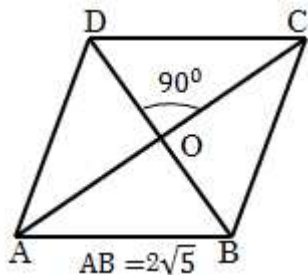
$$= \sqrt{900}$$

$$= 30$$

$$BO = 30$$

$$\text{Second diagonal } BD = 2BO = 60 \text{ cm}$$

19) Answer: B



In rhombus ABCD ,

first diagonal = AC

second diagonal = BD

$$4AB^2 = AC^2 + BD^2$$

$$4 \times 20 = AC^2 + BD^2$$

$$80 = AC^2 + BD^2$$

$$\therefore \text{Area of rhombus} = 1/2 \times AC \times BD = 16$$

$$AC \times BD = 32$$

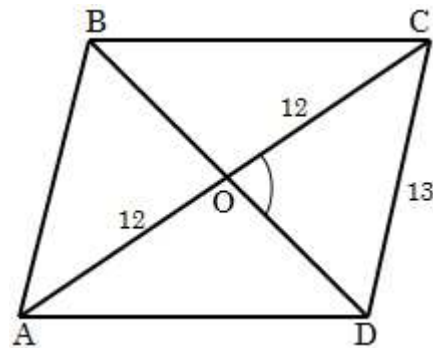
$$(AC + BD)^2 = 80 + 2 \times 32$$

$$(AC + BD)^2 = 80 + 64$$

$$(AC + BD)^2 = 144$$

$$AC + BD = 12 \text{ cm}$$

20) Answer: B



$$(OD)^2 = (CD)^2 - (OC)^2 \text{ (From pythagoras theorem)}$$

$$(OD)^2 = (13)^2 - (12)^2$$

$$(OD)^2 = 169 - 144$$

$$(OD)^2 = 25$$

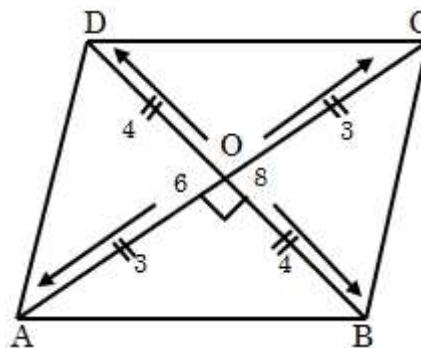
$$OD = 5 \text{ cm}$$

$$\text{Diagonal } BD = 2OD$$

$$BD = 10 \text{ cm}$$

21) Answer: D

$$\text{In rhombus } d_1 = 8, d_2 = 6 \text{ Perimeter} = ?$$



Diagonals of rhombus bisect each other at right angles.

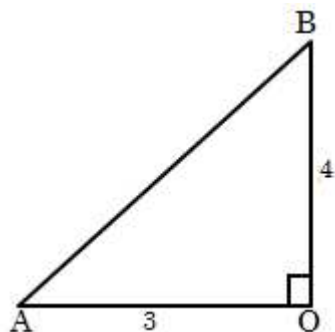
$$AO = OC$$

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$$BO = OD$$

$$\angle AOB = \angle BOC = \angle COD = \angle DOA = 90^\circ$$

Sides of rhombus AB



$$AB^2 = AO^2 + BO^2$$

$$AB^2 = 3^2 + 4^2$$

$$AB^2 = 25$$

$$AB = 5$$

$$\text{Perimeter of rhombus} = 4a$$

$$= 4 \times 5$$

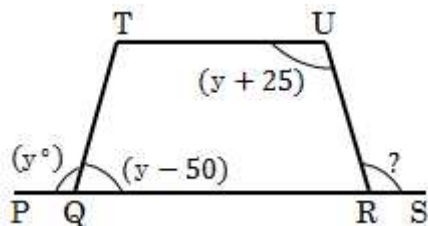
$$= 20 \text{ cm}$$

22) Answer: B

given- $TU \parallel PS$

$$\angle PQT = y, \angle RQT = (y - 50)^\circ$$

$$\angle TUR = (y + 25)^\circ, \angle URS = ?$$

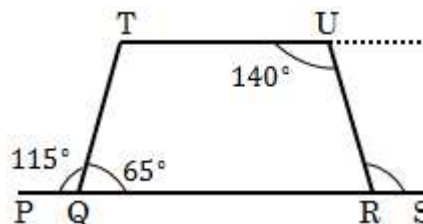


$$y + y - 50 = 180$$

$$2y = 230$$

$$y = 115^\circ$$

When writing an angle with a value of y



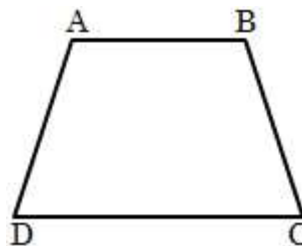
alternate angle $\angle TUR = \angle URS$

$$\angle URS = 140^\circ$$

23) Answer: D

Trapezium is a quadrilateral, which has a pair of parallel opposite sides.

$AB \parallel DC$



24) Answer: C

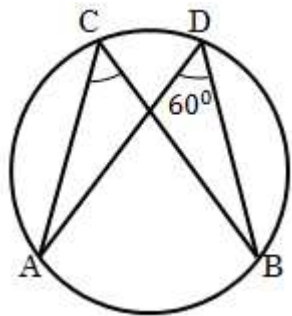
The rotational symmetry of a trapezium is (1) sequence.

Note - If a shape is partially rotated, if the shape looks the same even after rotating, then this property is called rotational symmetry.

25) Answer: B

$$\angle ADB = \angle ACB = 60^\circ$$

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Hence both information will be required,

The value of the angle subtended by an arc(chord) at the remaining circumference of the circle is the same.

$$\angle C = \angle D$$

Hence figure -2 to $\angle D = 60^\circ$

And it is clear from figure 1

That $\angle ACB = \angle ADB = 60^\circ$

26) Answer: A

$$AD \times BD = (DE)^2$$

$$(\text{let } BD = x)$$

$$(8+x) \times x = (3)^2$$

$$8x + x^2 = 9$$

$$x^2 + 8x - 9 = 0$$

$$x^2 + 9x - x - 9 = 0$$

$$x(x+9) - 1(x+9) = 0$$

$$x+9=0, x = -9 (\text{inadmissible})$$

$$x-1=0$$

$$x=1$$

$$BD \text{ length} = 1 \text{ cm}$$

27) Answer: B

A secant line and a tangent line are being drawn from point D.

$$\therefore DE^2 = AD \times BD$$

$$DE^2 = (AB + BD) \times BD$$

$$= (16 + 12) \times 12$$

$$= 28 \times 12$$

$$DE^2 = 336$$

$$DE = 18.33 \text{ cm}$$

28) Answer: B

Number of diagonals in a polygon with any n sides

$$= (n/2) \times (n-3)$$

$$\therefore \text{number of sides in a polygon } n = 27$$

$$\therefore \text{diagonal number} = (27/2) \times (27-3)$$

$$= (27 \times 24) / 2 = 27 \times 12 = 324$$

29) Answer: A

Let number of sides of polygon be = n

According to question—

$$(n-2)\pi = 1260,$$

$$(n-2)180 = 1260$$

$$n - 2 = 7,$$

$$n = 7 + 2,$$

$$n = 9$$

30) Answer: D

Let the angles be $4x^\circ$ and $5x^\circ$ respectively.

We know that the sum of two supplementary angles is 180° .

$$\therefore 4x^\circ + 5x^\circ = 180^\circ$$

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$$9x^0 = 180^0$$

$$x^0 = 20^0$$

$$\therefore \text{large angle}(5x^0) = 5 \times 20^0 = 100^0$$

31) Answer: C

Let the first angle $= 13x^0$

Second angle $= 5x^0$

Then,

$$13x^0 + 5x^0 = 180^0 \text{ (sum of supplementary angles)}$$

$$18x^0 = 180^0,$$

$$x^0 = 10^0$$

$$\text{First angle} = 13 \times 10^0 = 130^0$$

$$\text{Second angle} = 5 \times 10^0 = 50^0$$

$$\text{Intended difference} = 130^0 - 50^0 = 80^0$$

32) Answer: A

$$\angle AOC = 68^0$$

$$\therefore \angle BOC = 180 - 68$$

$$\angle BOC = 112^0$$

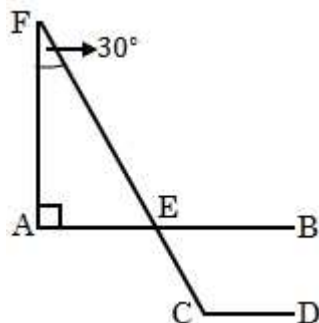
bisector of C is $\angle BOC$

$$\text{hence } \angle BOD = (\angle BOC)/2$$

$$\angle BOD = 112/2$$

$$\angle BOD = 56^0$$

33) Answer: B



Given,

$AB \parallel CD$

$$\angle AFE = 30^0$$

$$\angle FCD = ?$$

From $\triangle AEF$,

$$\angle AFE = 30^0 \text{ (given)}$$

$$\angle FAE = 90^0$$

$$\therefore \text{sum of three angles of } \triangle \text{ is } 180^0.$$

$$\therefore 90^0 + 30^0 + \angle AEF = 180^0$$

$$\therefore \angle AEF = 180^0 - 120^0 = 60^0$$

$$\angle BEC = 60^0 \text{ (Vertically opposite angles)}$$

$$\angle FEB + \angle BEC = 180^0$$

$$\angle FEB + 60^0 = 180^0$$

$$\angle FEB = 120^0$$

$$\therefore \angle FEB = \angle FCD \text{ (Corresponding angle)}$$

$$\therefore \angle FCD = 120^0$$

34) Answer: A

Sum of interior angles of an even polygon with n sides $= (2n-4) \times 90^0$

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\therefore Sum of interior angles of an even polygon of 8 sides. $= (2 \times 8 - 4) \times 90 = 1080^\circ$

35) Answer: C

External angle of a polygon $= 360^\circ / \text{number of sides}$

$$\text{External angle} = 360^\circ / 5 = 72^\circ$$

$$\text{Internal angle} = 180^\circ - 72^\circ = 108^\circ$$

36) Answer: C

Number of diagonals in a polygon with n sides $= [n(n-1)/2] - n$

$$= (19 \times (19-1)) / 2 - 19$$

$$= (19 \times 18) / 2 - 19$$

$$= 19 \times 9 - 19$$

$$= 19(9-1)$$

$$= 19 \times 8$$

$$= 152$$

37) Answer: C

Let angle $= x^\circ$

According to Question -

$$180^\circ - x = 3(90^\circ - x^\circ) + 35^\circ$$

$$2x^\circ = 270^\circ + 35^\circ - 180^\circ$$

$$2x^\circ = 125^\circ$$

$$x = 62.5^\circ$$

38) Answer: A

The sum of two complementary angles is 90° .

$$\text{Small angle} = 7 / (11+7) \times 90$$

$$= 7 / 18 \times 90 = 35^\circ$$

39) Answer: C

Each interior angle of a polygon with n sides $= [(n-2) \times 180] / n$

$$150 = ((n-2) \times 180) / n$$

$$30n = 360$$

$$n = 360 / 30 = 12$$

Hence this polygon will be a dodecagon

40) Answer: B

Let the number of sides of the polygon $= n$

According to Question,

$$(2n-4) \times 90 / n - 360^\circ / n = 108^\circ$$

$$180n - 360^\circ - 360^\circ = 108n$$

$$72 = 720$$

$$n = 720 / 72$$

So the number of sides $= 10$

41) Answer: C

The sum of the interior angles of the equilateral $= 1980^\circ$

$$(2n-4)90^\circ = 1980^\circ$$

$$(2n-4) = 22$$

$$2n = 26$$

$$n = 13$$

Thus, the polygon has 13 sides.

42) Answer: B

Let the angle $= x^\circ$

Supplementary angle $= 8x^\circ$

Sum of two supplementary angles $= 180^\circ$

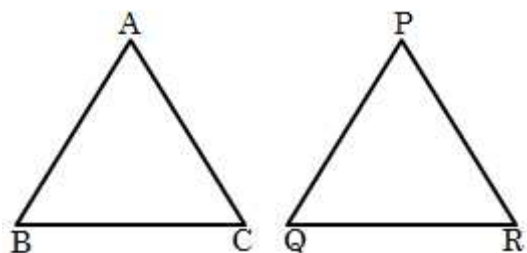
$$x + 8x = 180^\circ$$

$$9x = 180 \Rightarrow x = 20^\circ$$

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Desired angle = 20°

43) Ans: A



$\therefore \triangle ABC \sim \triangle PQR$

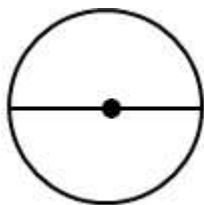
$$\therefore \frac{\text{Perimeter of } \triangle ABC}{\text{Perimeter of } \triangle PQR} = \frac{AB}{PQ}$$

$$\frac{36}{24} = \frac{AB}{10}$$

$$AB = \frac{360}{24} = 15$$

44) Answer: B

The largest chord of the circle is the "diameter" which



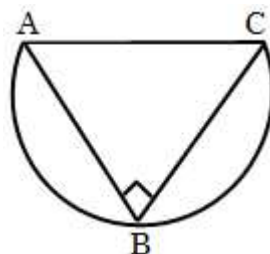
passes through the center of the circle.

45) Answer: C

The order of rotational symmetry of a parallelogram is 2.

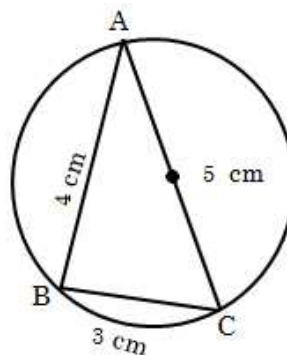
46) Answer: D

$$\angle ABC = 90^\circ$$



Theorem - Angle at a semicircle is right angle.

47) Answer: B

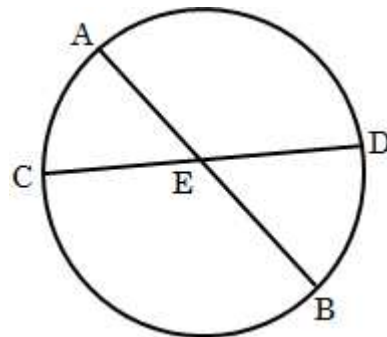


AC is the diameter of the circle.

\therefore Radius of circle (r) = 2.5 cm

$$\therefore \text{Area of circumcircle} = \pi r^2 = \pi \times (2.5)^2 = 6.25\pi \text{ cm}^2$$

48) Answer: C



$$m \overline{AE} = 8 \text{ cm}$$

$$m \overline{BE} = 30 \text{ cm}$$

$$m \overline{CE} = 5 \text{ cm}$$

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$$m\overline{DE} = ?$$

$$\boxed{AE \times BE = CE \times DE}$$

$$8 \times 30 = 5 \times DE$$

$$DE = (8 \times 30) / 5$$

$$DE = 48 \text{ cm}$$

49) Answer: D

∴ The angle made by the chord of a circle along the tangent line is equal to the angle subtended by that chord at the intersecting segment of the circle.

$$\angle BAC = \angle BCD = 78^\circ$$

50) Answer: C

From the theorem,

$$DE^2 = DB \times DA = 6 \times 24$$

$$DE^2 = 144$$

$$DE = 12 \text{ cm}$$

Simple Interest and Compound Interest

1) Find the Compound interest on a sum of Rs. 1000 for 2.5 years at the rate of 10% per annum?

- a) 270.5
- b) 300
- c) 270
- d) 250

2) Find the compound interest on the sum of Rs. 1200 for 2 years at the rate of 8.5% per annum?

- a) 200
- b) 208.33
- c) 308.33
- d) None of these

3) Find the Principle if the compound interest earned in 2 years at the rate of 8% per annum is Rs 1.664?

- a) 20
- b) 10
- c) 30
- d) 100

4) If the compound interest earned at the rate of 13% per annum for 2 years is Rs 27.69% then find the Principle?

- a) 100
- b) 10
- c) 1000
- d) 200

5) How much will a sum of 2500, invested at compound interest, amount to in 1 year at 4% interest rate, interest compounded half-yearly

- a) 2610

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b) 2601

c) 2656

d) 2600

6) If the simple interest on a sum at the rate of 8% for 3.5 years per annum is 1680 then find the sum?

a) 470.4

b) 4800

c) 6000

d) 4040

7) If the Simple interest on a sum at the rate of 4% for 2.5 years is Rs. 80 then find the Amount?

a) 808

b) 800

c) 990

d) 880

8) If the same Principle was invested in two schemes A and B for the same term at the rate of 8% while interest in A was Simple interest and in B it was Compound interest then find the ratio between their interests?

a) 1 : 1

b) 2 : 3

c) 3 : 2

d) Cannot be determined

9) If the Compound interest on a sum is Rs.840 at the rate of 10% for two years then find the simple interest on same sum for same parameters?

a) 800

b) 750

c) 1200

d) 1500

10) Find the rate per annum when the interest for 4 years is $\frac{4}{7}$ times of the sum invested initially?

a) 3%

b) 2.04%

c) 3.50%

d) 4.50%

11) Find the time taken by the sum to becomes 8 times of itself when rate being 4% per annum?

a) 175 years

b) 180 years

c) 190 years

d) 100 years

12) Find the rate per annum if the sum of 16 units grows to 30 units in 4 years at simple interest?

a) 21.875%

b) 33.5%

c) 25.5%

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d) None of these

13) Find the amount when simple interest earned on a sum for 2 years at the rate of 5% per annum is Rs. 140?

a) 1546

b) 1450

c) 1500

d) 1540

14) A sum of money lent out at the simple interest amount to Rs. 720 after 2 years and to Rs. 1020 after a further period of 5 years. The sum is ;

a) 520

b) 500

c) 420

d) 320

15) In how many years Rs. 150 will produce the same interest @ 8% as Rs. 800 produce in 3 years @ 4.5%?

a) 9 years

b) 10 years

c) 5 years

d) 6 years

16) In how much time would the simple interest on a certain sum be 0.125 times the principle at 10% per annum?

a) 2.5 years

b) 1.5 years

c) 2 years

d) 1.25 years

17) If the simple interest is $\frac{6}{7}$ times of the principle for 3 years then find the rate of interest per annum?

a) 25.87%

b) 28.57%

c) 32.57%

d) 38.57%

18) The rate at which a sum becomes four times of itself in 10 years at simple interest will be;

a) 15%

b) 25%

c) 30%

d) 35%

19) How long will it take a sum of money invested at 6% to grow its value by 48%?

a) 4 years

b) 6 years

c) 5 years

d) 8 years

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20) If a sum of money at simple interest doubles in 5 years , it will becomes 6 times in ;

- a) 20 years
- b) 25 years
- c) 15 years
- d) 30 years

21) At what rate of simple interest will a money double itself in 10 years?

- a) 20%
- b) 10%
- c) 5%
- d) 15%

22) If the invested sum and time in scheme A and B is same, and rate being 4% and 5% per annum then find the ratio between the simple interest earned?

- a) 4 : 5
- b) 5 : 4
- c) 2 : 3
- d) 16 : 25

23) At what rate percent per annum will a sum of money double in 16 years?

- a) 6.25%
- b) 12.5%
- c) 8.5%

d) 4.5%

24) The simple interest on the sum is $\frac{4}{9}$ times of the principle, find the rate per annum if rate and time both are numerically equal?

- a) 9.9
- b) 3.5
- c) 6.6
- d) 13.13

25) Find the simple interest on Rs. 68,000 at $16\frac{2}{3}\%$ per annum for 6 months?

- a) 5666.67
- b) 5888.7
- c) 5662
- d) None of these

26) A sum amounts to Rs. 2502.50 at $13\frac{1}{2}\%$ per annum for simple interest in 4 years then find the sum invested?

- a) 1600
- b) 1500
- c) 1625
- d) 1565

27) A sum was putted at the rate of $x\%$ for 2 years earns some simple interest had it putted for $(x + 3)\%$ for 2 years then the interest would be Rs. 120 more then find the sum?

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a) 200

b) 2000

c) 20000

d) 1000

28) A sum was putted at the rate of $x\%$ for 3 years earns some simple interest had it putted for $(x + 3)\%$ for 3 years then the interest would be Rs. 180 more then find the sum?

a) 1000

b) 2000

c) 1500

d) None of these

29) A sum was putted at the rate of $x\%$ for 3.5 years earns some simple interest had it putted for $(x + 2)\%$ for 3.5 years then the interest would be Rs. 140 more then find the sum?

a) 2100

b) 1500

c) 1400

d) 2000

30) A sum was putted at the rate of $(x + 1.5)\%$ for 2 years earns some simple interest had it putted for $x\%$ for 2 years then the interest would be Rs. 60 less then find the sum?

a) 1500

b) 1000

c) 2000

d) 2500

31) A sum was putted at the rate of $(2x + 1.5)\%$ for 2 years earns some simple interest had it putted for $2x\%$ for 2 years then the interest would be Rs. 30 less then find the initial amount?

a) Rs. 500

b) Rs. 1000

c) Rs. 375

d) Cannot be determined

32) The compound interest on Rs. 30,000 @ 7% per annum is Rs. 4347. The term in years will be ;

a) 1 years

b) 2 years

c) 3 years

d) 4 years

33) What will be the difference in the Ci and Si on the sum of rupees 10,500 at the rate of 3% for 2 years?

a) 9.45/-

b) 0

c) 9 /-

d) 10 /-

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34) Find the compound interest on Rs. 15,625 for 6 months at 16% per annum compounded quarterly?

- a) 1575
- b) 1275
- c) 1475
- d) 1375

35) If the compound interest on a sum for 2 years at 12.5% per annum is Rs. 510 , the simple interest on the same sum at the same rate for the same period of time is ;

- a) 520
- b) 420
- c) 480
- d) 120

36) The simple interest on a certain sum of money for 3 years at 8% per annum is half the compound interest on Rs. 4000 for 2 years @ 10% per annum. The sum placed on the simple interest is;

- a) 1750
- b) 2750
- c) 2875
- d) 2975

37) There is 30% increase in the value of sum invested at 3% per annum at simple interest. Find the

simple interest earned on 15,000 for the same time at 2% per annum?

- a) 4000
- b) 5000
- c) 3000
- d) None of these

38) Find the simple interest on Rs. 20480 at 6.25% per annum for 2.5 years?

- a) 3800
- b) 6400
- c) 1600
- d) 3200

39) Find the difference between Ci & Si on the sum of Rs. 5000 for 2 years at 10% per annum?

- a) Rs. 5
- b) Rs. 500
- c) Rs 0
- d) Rs. 50

40) Find the difference between Ci & Si on the sum of Rs. 15000 for 2.5 years at 10% per annum?

- a) 307.5
- b) 407.5
- c) 807.5

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d) None of these

41) Find the Compound interest on the sum of Rs. 6000 for $2\frac{2}{3}$ years at 9% per annum?

a) 1556.31

b) 1500.31

c) 1456.31

d) 1356.31

42) Find the Compound interest on the sum of Rs. 800 for $1\frac{2}{5}$ years at 10% per annum?

a) Rs. 135.2

b) Rs. 115.2

c) Rs. 145.2

d) Rs. 165.2

43) A sum of money becomes 1296 in 2 years and 1600 in 4 years then find the Effective rate for 2 years?

a) 10%

b) $9\frac{1}{11}\%$

c) $11\frac{1}{9}\%$

d) 12%

44) A sum of money becomes 441 in 2 years and 576 in 4 years then find the Effective rate of 2 years?

a) 19.23%

b) 25%

c) 17.31%

d) Cannot be determined

45) A sum of money becomes 343 in 2 years and 729 in 5 years then find the Effective rate of 3 years?

a) 14.91%

b) 14.27%

c) 28.57%

d) Cannot be determined

46) A sum of money becomes 216 in 2 years and 729 in 5 years then find the Effective rate of 3 years?

a) 50%

b) 25%

c) 37.5%

d) 26.01%

47) A man invested in two schemes A and B , the sum invested is same and rate being 5% and 7% for 7 years and 9 years respectively. Find the ratio of their simple interest?

a) 9 : 5

b) 5 : 9

c) 5 : 7

d) 5 : 4

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48) If the ratio of Si to Ci is 34 : 37 while all the parameters being same then find the rate of interest per annum?

- a) 17.64%
- b) 18.75%
- c) 19.75%
- d) Cannot be determined

49) If the ratio of Si to Ci is 300 : 321 while all the parameters being same then find the rate of interest for per annum?

- a) 14.5%

- b) 21%
- c) 7%
- d) 14%

50) Find the Si for the same sum and rate but for three years if the Ci on a sum for 2 years at the rate of 11(1/9)% is 95 rupees?

- a) 135/-
- b) 235/-
- c) 335/-
- d) 435/-

Simple Interest and Compound Interest – Answers and Explanation

1) Answer: A

Solution:

Principle = 1000

Rate = 10%

Time = 2.5 years

Let principle = 1000

Interest on first year	Interest on second year	Interest on third year
100	100	100
	10	10
		10
		1

Since we have T = 2.5 years.

So we will take half interest of 3rd year.

Compound Interest = 100 + 110 + 60.5

Compound Interest = 270.5

2) Answer: B

Solution:

8.5% = 1/12

Let Principle = 144

1 st year interest	2 nd year interest
12	12
	1

Compound Interest = 25 units

Principle = 144 units = 1200

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1 unit = 25/3 rupees

Compound Interest = 625/3

Compound Interest = 208.33

3) Answer: B

Solution:

Principle = 100%

Rate = 8%

Time = 2 years

Compound Interest = Rs 1.664

Effective rate for 2 years = $8 + 8 + 8 \times 8/100$

Effective rate = 16.64%

16.64% = 1.664

1% = 0.1 rupees

100% = 10

4) Answer: A

Solution:

Principle = 100%

Rate = 13%

Time = 2 years

Compound Interest = Rs 27.69%

Effective rate for 2 years = $13 + 13 + 13 \times 13/100$

Effective rate = 27.69%

27.69% = 27.69%

1% = 1 rupees

100% = 100

5) Answer: B

Solution:

P = 2500

R = 4% per annum = 2% per half-yearly

T = 1 year = 2 half year

Interest on first year	Interest in second year
50	50
	1

Compound Interest = 50+50+1=101

Amount = P+CI = 2500+101=2601

6) Answer: C

Solution:

S.I = 1680

Rate = 8%

Time = 3.5 years

Simple Interest = $(P \times R \times T)/100$

1680 = $(P \times 8 \times 3.5)/100$

P = 6000

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7) Answer: D

Solution:

Amount =?

Principle =?

Simple Interest = 80

Rate = 4%

Time = 2.5 years

Simple Interest = $(P \times R \times T)/100$

$80 = (p \times 4 \times 2.5)/100$

$P = 800$

$A = P + SI$

Amount = $800 + 80 = 880$

8) Answer: D

Solution:

	A	B
P	p	p
Rate	8	8
Time	T	T
Interest	CI	SI

This question cannot be solved because time is not given in the question because the interest will be varied with time.

9) Answer: A

Solution: Let $P = 100\%$ $R = 10\%$ $T = 2$ years

Effective rate = $10 + 10 + 10 \times 10/100$

Effective rate = 21%

21% = Rs. 840

1% = Rs. 40

100% = 4000

Simple Interest = $(P \times R \times T)/100$

Simple Interest = $(4000 \times 10 \times 2)/100$

Si = 800/-

10) Answer: B

Solution: Time = 4 years Let $P = 7$ units

Si = 1 unit/year

$Si = (P \times R \times T)/100$

$1 = (7 \times R \times 7)/100$

Rate = 2.04%

11) Answer: A

Solution: Time =? Rate = 4% Let $P = 1$ units $A = 8$ units.

Simple Interest = 7 units

Simple Interest = $(P \times R \times T)/100$

$7 = (1 \times 4 \times T)/100$

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T = 175 years

12) Answer: A

Solution: Let p = 16 units T = 4 years A = 30 units

Si = 14 units

Simple Interest = (P×R×T)/100

$$14 = (16 \times R \times 4)/100$$

Rate = 21.875%

13) Answer: D

Solution:

A = ? Rate = 5% T = 2 years Si = 140

Simple Interest = (P × R × T)/100

$$140 = (P \times 5 \times 2)/100$$

P = 1400

A = P + Si

$$A = 1400 + 140$$

A = 1540

14) Answer: A

Solution:

P	(Si) ₂	(Si) ₅
P	720	1020

$$(Si)_3 = 1020 - 720$$

$$(Si)_3 = 300$$

Simple Interest = 300/3 = Rs. 100 per year

$$A = 720$$

$$Si = 200$$

$$P = 520$$

15) Answer: A

Solution:

P = 150 Rate = 8% T = ?

Simple Interest = (P × R × T)/100

$$\text{Simple Interest} = (150 \times 8 \times T)/100 \dots\dots\dots(1)$$

Now, P = 800/- Rate = 4.5% T = 3

$$\text{Simple Interest} = (800 \times 4.5 \times 3)/100$$

$$\text{Simple Interest} = 108$$

From eq (1)

$$(108 \times 100)/ (150 \times 8) = T$$

$$T = 9 \text{ years}$$

16) Answer: D

Solution: 0.125 = 1/8 units

Let P = 8 unit and Si = 1 unit

$$1 = (10 \times 8 \times T)/100$$

$$T = 1.25 \text{ years}$$

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17) Answer: B

Solution: Let P = 7 unit and Si = 6 unit

Time = 3 years

$$6 = (7 \times 3 \times r)/100$$

$$\text{Rate} = 28.57\%$$

18) Answer: C

Solution: T = 10 years

Let p = 1 unit

$$A = 4 \text{ units}$$

$$Si = 3 \text{ units}$$

$$Si = (P \times R \times T)/100$$

$$3 = (1 \times R \times 10)/100$$

$$\text{Rate} = 30\%$$

19) Answer: D

Solution: Rate = 6%

Let p = 100%

$$Si = 48\%$$

$$48 = (100 \times 6 \times T)/100$$

Time = 8 years

20) Answer: B

Solution: Let p = 1 unit

$$A = 2 \text{ units}$$

$$Si = 1 \text{ units}$$

$$1 = (1 \times 5 \times R)/100$$

$$\text{Rate} = 20\%$$

Now, to make it 6 times,

$$P = 1 \text{ unit}$$

$$Si = 5 \text{ units}$$

$$\text{Rate} = 20\%$$

$$5 = (1 \times 20 \times t)/100$$

$$\text{Time} = 25 \text{ years.}$$

21) Answer: B

Solution: Let p = 1 unit

$$A = 2 \text{ units}$$

$$Si = 1 \text{ unit}$$

$$Si = (P \times R \times T)/100$$

$$1 = (1 \times R \times 10)/100$$

$$\text{Rate} = 10\%$$

22) Answer: A

Solution:

	A	B
P	p	p
Rate	4	5
Time	T	T

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Interest Si Si

Interest ratio of A : B = 4 : 5

23) Answer: A

Solution: Let p = 1 unit

A = 2 units

Si = 1 unit

$$Si = (P \times R \times T)/100$$

$$1 = (1 \times R \times 16)/ 100$$

$$Rate = 6.25\%$$

24) Answer: C

Solution: Let p = 9 unit

A = 13 units

Si = 4 unit

$$Si = (P \times R \times T)/100$$

$$4 = (9 \times R \times R)/ 100$$

$$Rate = 6.6\%$$

25) Answer: A

Solution:

$$p = 68,000/- \qquad R = 16(2/3)\% \qquad T = 6 \text{ months}$$

$$Si =(P \times R \times T)/100$$

$$SI =(68000 \times 1 \times 6)/(6 \times 12)$$

$$Si = 5666.67/-$$

26) Answer: C

Solution:

Let Principle = 100%

$$Si = 13.5\% \times 4$$

Si = 54% of principle

Amount = Principle + Simple Interest

$$Amount = 154\%$$

$$154\% = 2502.50$$

$$100\% = Rs. 1625$$

27) Answer: B

Solution:

Let Principle = 100%

Extra rate = 3%

$$Extra \text{ rate for } 2 \text{ years} = 3 \times 2 = 6\%$$

$$6\% = Rs. 120$$

$$1\% = Rs. 20$$

$$100\% = 2000$$

28) Answer: B

Solution:

Let Principle = 100%

Extra rate = 3%

$$Extra \text{ rate for } 3 \text{ years} = 3 \times 3 = 9\%$$

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9% = Rs. 180

1% = Rs. 20

100% = 2000

29) Answer: D

Solution:

Let Principle = 100%

Extra rate = 2%

Extra rate for 3.5 years = $3.5 \times 2 = 7\%$

7% = Rs. 140

1% = Rs. 20

100% = 2000

30) Answer: C

Solution:

Let Principle = 100%

Extra rate = 1.5%

Extra rate for 2 years = $1.5 \times 2 = 3\%$

3% = Rs. 60

1% = Rs. 20

100% = 2000

31) Answer: B

Solution: Let Principle = 100%

Extra rate = 1.5%

Extra rate for 2 years = $1.5 \times 2 = 3\%$

3% = Rs. 30

1% = Rs. 10

100% = 1000

32) Answer: B

Solution: P = 30,000/- Rate = 7% Ci = 4347/-

Effective Rate = $(4347/30,000) \times 100$

Effective rate = 14.49%

We know that effective rate of 7% for time = 2 years is 14.49%

Time = 2 years.

33) Answer: A

Solution:

P = 10,500 R = 3% T = 2 years

Si = $(P \times R \times T)/100$

Si = 630/-

Effective rate = $3 + 3 + 3 \times 3/100$

Effective rate = 6.09%

Ci = 6.09% of 10,500

Ci = 639.45

Difference = 9.45

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34) Answer: B

Solution:

$P = 15,625$ $R = 4\%$ $T = 2 \text{ years}$

$4\% = 1/25$

Let principle = 625 units

625

1st year

2nd year

25

25

1

$Ci = 51 \text{ units}$

$625 \text{ units} = \text{Rs } 15,625$

$1 \text{ unit} = \text{Rs. } 25$

$Ci = 51 \times 25$

$Ci = \text{Rs. } 1275$

35) Answer: C

Solution: Rate = 12.5% = 1/8

P A

8 9

8 9

64 81

Compound Interest = $A - P$

Compound Interest = 17 units

17 units = 510

1 unit = 30

$P = 64 \text{ units}$

$P = 64 \times 30$

$P = 1920$

Simple Interest = $(1920 \times 12.5 \times 2)/100$

Simple Interest = Rs. 480

36) Answer: A

Solution:

$P = \text{Rs. } 4000$ $T = 2 \text{ years}$ $R = 10\% \text{ per annum}$

Effective rate = 21%

Compound Interest = 21% of 4000

Compound Interest = Rs. 840

Simple Interest = $0.5 \times \text{Compound Interest}$

Simple Interest = Rs. 420

Simple Interest = $(P \times R \times T)/100$

$420 = (P \times 3 \times 8)/100$

$P = \text{Rs. } 1750$

37) Answer: C

Solution:

Let $P = 100\%$ $R = 3\%$ $Si = 30\%$ $t = ?$

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Simple Interest = $(P \times R \times T) / 100$

$30 = (100 \times 3 \times T) / 100$

Time = 10 years

Now, P = 15,000/- R = 2% T = 10 years

Simple Interest = $(P \times R \times T) / 100$

Simple Interest = $(15000 \times 2 \times 10) / 100$

Simple Interest = 3000

38) Answer: D

Solution:

P = 20480 R = 6.25% T = 2.5 years

Simple Interest = $(P \times R \times T) / 100$

Simple Interest = $(20,480 \times 6.25 \times 2.5) / 100$

Simple Interest = 3200

39) Answer: D

Solution: P = 5000 R = 10% T = 2 years

Simple Interest = $(P \times R \times T) / 100$

Simple Interest = $(5000 \times 10 \times 2) / 100$

Simple Interest = 1000

Effective rate = $10 + 10 + 10 \times 10 / 100$

Effective rate = 21%

Ci = 21% of 5000

Ci = 1050/-

Difference = Rs. 50

40) Answer: A

Solution: 15000

1 st year	2 nd year	3 rd year
1500	1500	1500
	150	150
		150
		15

Si for 2.5 years = 1st year + 2nd year + (3rd year/2)

Si for 2.5 years = 3750

Ci for 2.5 years = 1st year + 2nd year + (3rd year/2)

Ci for 2.5 years = 4057.5

Difference = Rs. 307.5

41) Answer: A

Solution:

P = 6000

Rate = 9%

Time = $2\frac{2}{3}$ years

Rates: 1st year - 9%

2nd year - 9%

3rd year - 6%

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Effective rate = $R_1 + R_2 + R_3 + (R_1 \times R_2 \times R_3) / 10000$
 $+ (R_1 R_2 + R_3 R_2 + R_3 R_1) / 100 \dots\dots\dots(1)$

Effective rate = 25.93%

Ci = 25.93% of 6000

Ci = Rs. 1556.31

42) Answer: B

Solution:

P = 800/- Rate = 10% Time = $1(2/5)$ years

Interest Rates:

1st year - 10%

2nd year - 4%

Effective rate = $R_1 + R_2 + (R_1 \times R_2) / 100 \dots\dots\dots(1)$

Effective rate = 14.40%

Compound Interest = 14.40% of 800

Compound Interest = Rs. 115.2

43) Answer: C

Solution:

P	A ₂	A ₄
P	$\sqrt{1296}$	$\sqrt{1600}$
	36	40
	9	10

Compound Interest = $10 - 9 = 1$ units

Rate = $(1/9) \times 100$

Rate = 11(1/9)%

44) Answer: A

Solution:

P	A ₂	A ₄
P	$\sqrt{441}$	$\sqrt{576}$
	21	26

Ci = $26 - 21 = 5$ units

Rate = $(5/26) \times 100$

Rate = 19.23%

45) Answer: C

Solution:

P	A ₂	A ₅
P	$\sqrt[3]{343}$	$\sqrt[3]{729}$
	7	9

Compound Interest = $9 - 7 = 2$ units

Rate = $(2/7) \times 100$

Rate = 28.57%

46) Answer: A

Solution:

P	A ₂	A ₅
P	$\sqrt[3]{216}$	$\sqrt[3]{729}$

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6

9

Compound Interest = 3 units

Rate = $(3/6) \times 100$

Effective Rate = 50%

47) Answer: B

Solution:

Scheme	A	B
P	p	p
Rate	5	7
Time	7	9
Interest	35%	63%

A : B = 5 : 9

48) Answer: A

Solution:

Let Si = 34 units

Let Ci = 37 units

Both the interests are for 2 years.

Si for 1 year = 17 units

Exceeding part = 3 units (Compound interest)

Rate = $(3/17) \times 100$

Rate = 17.64%

49) Answer: D

Solution: Let Si = 300 units

Let Ci = 321 units

Both the interests are for 2 years.

Si for 1 year = 150 units

Exceeding part = 21 units (Compound interest)

Rate = $(21/150) \times 100$

Rate = 14%

50) Answer: A

Solution:

Ci = 95/- Rate = $11(1/9)\%$

Time = 2 years

$11(1/9)\% = 1/9$

Let principle = $9^2 = 81$ units

	81	
	1 st year	2 nd year
	9	9
		1

Ci = 19 units

19 units = Rs 95

1 Unit = Rs. 5

81 unit = 405/-

Now , Simple interest

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$$Si = (P \times R \times T) / 100$$

$$Si = (405 \times 1 \times 3) / (9)$$

$$Si = 135/-$$

Discount

- One shop offers 70% discount on MRP of 1 product. If MRP of product is Rs.750, then what is selling price?
 - Rs.700
 - Rs.250
 - Rs.730
 - Rs.225
- Marked price of a shirt was Rs. 800. During Durga Puja festival offers, 20% discount is given on it. What will be selling price of shirt?
 - Rs.400
 - Rs.540
 - Rs.640
 - Rs.600
- Nikita bought a book for Rs. 1800 at a discount of 30% and sold it at 5% profit. How much did she earn?
 - Rs.99
 - Rs.90
 - Rs.900
 - Rs.100
- The marked price of an article is 420 and its selling price is 350. What is the discount rate (up to one full digit of decimal) given on item?
 - 16%
 - 15.8%
 - 16.6%
 - 18.3%
- The current price of a computer is Rs. 32400, which is 20% less than its previous year's price. What was the price of computer last year?
 - Rs.40000
 - Rs.41500
 - Rs.45000
 - Rs.40500
- If the market price is 50% more than cost price and 20% discount is offered on market price, then what is profit in percentage?
 - 20%
 - 10%
 - 21%
 - 40%

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7. In a factory, the sales center decided not only to get rid of old stock but to get variable costs in process. In such a case, he sold each set of cup for Rs. 499. If fixed cost is 50% of total cost, then what was cost price of each set of less?
- a) Rs.999
 - b) Rs.989
 - c) Rs.998
 - d) Rs.899
8. One person bought a pen in a sale and saved Rs 10. If he spends Rs. 55, then how much will he save?
- a) 15.3%
 - b) 15%
 - c) 10.3%
 - d) 18.3%
9. A shop sells clothes at a 40% discount on weekends. On Sunday, an additional discount of 20% is available on the discounted price. You buy a shirt on Sunday for Rs. 144, then how much more money you have to pay to buy same shirt on Tuesday of same month?
- a) Rs.165
 - b) Rs.150
 - c) Rs.155
 - d) Rs.156
10. Find the selling price when marked price is 80 and the discount is 6%?
- a) 75.2
 - b) 72.3
 - c) 70.2
 - d) 75.5
11. A publisher added 30% of production cost of book and fixed selling price of book at Rs. 390. Although, he gives a discount of 20% on the selling price for selling the book. What will be profit percentage?
- a) 4.5
 - b) 5
 - c) 3
 - d) 4
12. Himesh bought a book at a discount of 40% off its marked price. But sold it at Cost price. What is the profit or loss percentage in entire transaction?
- a) 66.6% Profit
 - b) 66.6% Loss
 - c) 60.6% Profit
 - d) 60.6% Loss
13. Including GST the price of a TV is Rs. 62000. If the rate of GST is 24%, then what is the original price of TV?
- a) Rs.55000

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- | | |
|---|--|
| b) Rs.50500
c) Rs.50000
d) Rs.40050 | a) 89%
b) 89.5%
c) 98%
d) 98.5% |
| 14. A shopkeeper also earns 15% profit by giving 10% discount to his customers. What will be the marked price of that item whose cost price is Rs. 900?
a) Rs.1150
b) Rs.1100
c) Rs.1050
d) Rs.1,000 | 18. After giving 40% discount on marked price, the teenager earns a profit of 26%. How much is marked price more than cost price?
a) 110%
b) 90.50%
c) 100%
d) 88.90% |
| 15. The marked price of an article is Rs. 250 and selling price is Rs. 225. Find the discount rate.
a) 11%
b) 11.5%
c) 10%
d) 10.5% | 19. A shopkeeper earns 30% profit even after offering 20% discount on marked price. If cost price is Rs. 1600, then find the marked price?
a) Rs.2600
b) Rs.3600
c) Rs.2650
d) Rs.3650 |
| 16. Two devices whose cost price is Rs. 25,000 and Rs. 75,000 respectively, they are given a discount of 10% and 20% respectively. Find total selling price.
a) Rs.82,200
b) Rs.28,500
c) Rs.82,500
d) Rs.82,50 | 20. An item was sold for a discount of 20% for Rs. 4800. If discount is 25%, find the selling price of article.
a) Rs.450
b) Rs.4,500
c) Rs.45000
d) Rs.4,400 |
| 17. What is a single discount equivalent to 75%, 30% and 40% successive discounts? | |

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21. A trader sells his goods at a 70% discount by marking the cost price over 60%. Find its profit or loss.
- a) 32% Profit
 - b) 30% Loss
 - c) 52% Loss
 - d) 10% Loss
22. A profit of 13% is made by selling a shirt after offering a discount of 20%. If the marked price of the shirt is Rs. 2260, find its cost price.
- a) Rs. 1850
 - b) Rs. 1780
 - c) Rs. 1600
 - d) Rs. 1900
23. A trader marks 40% more than the cost price on his goods and gives a discount of 20%. What is his profit percentage?
- a) 10%
 - b) 15%
 - c) 12%
 - d) 25%
24. A shopkeeper offers two sequential discounts of 70% and 20% and gets Rs. 480 for his product. Find its actual price.
- a) Rs.200
 - b) Rs.2002
 - c) Rs.2000
 - d) Rs.2200
25. Find the discount (in percent), If a book of Rs. 70 marked price is sold for Rs. 56.
- a) 20.5%
 - b) 20%
 - c) 21.5%
 - d) 21%
26. Mahi bought a mobile phone after 50% discount on marked price and sold it at a profit of 35% of its cost price for Rs. 40500. What was marked price?
- a) Rs.45000
 - b) Rs.60000
 - c) Rs.44500
 - d) Rs.58000
27. What is the maximum amount of discount Sushila can give to her customers on the marked price that she has neither profit nor loss on selling her goods, If she has already marked the cost price 50% higher?
- a) 30.44
 - b) 33.33
 - c) 31.41
 - d) 40.43
28. Even after giving 60% discount on marked price, a jacket was sold for 25% at a profit of

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Rs. 400. If it is sold at marked price, then what will be percentage profit.

- a) 250.5%
- b) 145.05%
- c) 212.5%
- d) 140.05%

29. Arvind buys a bag whose marked price is Rs. 500, he buys it for Rs. 180 after two consecutive discounts. If second discount is 10%, find the first discount.

- a) 40%
- b) 30%
- c) 60%
- d) 80%

30. Ramesh bought a bicycle at a marked price of Rs. 2000 after a discount of 10% and 15% respectively. Rs. 70 spent on repairs. Then he sold this bicycle for 2000 rupees. Find the profit percentage.

- a) No Profit
- b) 25%
- c) 30%
- d) 35%

31. Rani marks 40% more than cost price on an item. What percent discount should be given to get 20% profit?

- a) 14.29%

b) 16.37%

c) 15%

d) 18.58%

32. A shopkeeper marks the price of an item at Rs. 640. If even after 20% discount, he makes 25% profit on cost price, then find cost price of article?

- a) Rs.560.60
- b) Rs.409.60
- c) Rs.600.60
- d) Rs.490.60

33. A trader marked 25% higher price on a commodity and later gave 20% discount on it. What percentage of profit did the trader get after discounting?

- a) 30 % Profit
- b) 25 % Profit
- c) No Profit No Loss
- d) 20 % Loss

34. The marked price of small and big copies is Rs. 5 and Rs. 10 respectively. A student purchases 10 dozen small copies and 15 dozen big copies at a total discount of 5%. Find the discount amount.

- a) Rs. 115
- b) Rs.112
- c) Rs.120

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- d) Rs.128
35. A box of 40 items was purchased for a discount of 30% for Rs. 8400. What is the price of each item?
- a) Rs.300
b) Rs.350
c) Rs.400
d) Rs.450
36. A shopkeeper buys a hard disk with a marked price of Rs. 2000 sequentially after discount of 10 percent and 15 percent respectively. If he spends Rs. 70 for packing and sells it for Rs. 2,000, then find its profit percentage.
- a) No Profit
b) 25%
c) 30%
d) 35%
37. Rajesh buys a TV after a discount of 20% for Rs. 16,000. He later finds that the same store was selling that TV online for Rs. 15,725 after a 15% discount. What is the difference between marked price of store-bought TV and marked price of online TV?
- a) Rs.1500
b) Rs.1700
c) Rs.2800
d) Rs.2200
38. A sari is sold for a discount of 10% at Rs.5445. Find its marked price.
- a) 5060
b) 6500
c) 6050
d) 6005
39. A shopkeeper buys a stereo system with a marked price of Rs. 1000 after a discount of 10% and 15% respectively. He spends Rs. 35 getting it packed and sells it for Rs. 1000. Find percentage profit of the shopkeeper.
- a) No Profit
b) 25%
c) 30%
d) 35%
40. Find the discount rate, when the marked price is Rs. 625 and selling price is Rs. 425.
- a) 31%
b) 33%
c) 32%
d) 23%
41. A shopkeeper gives his customer 20% discount on marked price of an item, Yet he gains 25%. If marked price is Rs. 420, then calculate cost price.
- a) Rs.268.8
b) Rs.265.8

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- c) Rs.286.8
d) Rs.289.8
42. Even after giving a 22% discount, how much should the marked price of an item be above its cost price to get 17% profit?
a) 50%
b) 35%
c) 28%
d) 45%
43. If the selling price is Rs. 1680, So there is a loss of 16%. If even after giving 8% discount, there is a profit of 15%, then what should be marked price of the product?
a) Rs.2200
b) Rs.2000
c) Rs.2500
d) Rs.2600
44. A shopkeeper offers 10% off in every 4 months. If a person buys an item under this scheme in December for Rs. 25515, then what was initial price of that item in January?
a) Rs.45000
b) Rs.35000
c) Rs.36000
d) Rs.40000
45. Which one is better?
(1) 20% and 30% gradual discount.
(2) 30% and 20% gradual discount.
a) Both are similar
b) Cannot be determined
c) 30% and 20% gradual discount.
d) 20% and 30% gradual discount.
46. Find the selling price of an article, if the shopkeeper gives two consecutive discounts of 10% at marked price Rs. 150.
a) Rs.120.5
b) Rs.170.5
c) Rs.121.5
d) Rs.117.5
47. An item listed for Rs. 195 was purchased after two successive discounts for Rs. 17.55, the first of which is 10%. Find second discount.
a) 90%
b) 60%
c) 20%
d) 40%
48. The list price of an item in a showroom is Rs. 4000, and it is being sold at consecutive discounts of 10% and 20%. Find its net selling price.
a) Rs.2880
b) Rs.2800
c) Rs.1440
d) Rs.1880

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49. With a 25% reduction in market price, Sita can buy 1 kg more sugar for Rs. 30. Find actual price of sugar.

- a) Rs.7.50
- b) Rs.10
- c) Rs..50
- d) Rs.7.30

50. A gradual discount of 20% and 30% is displayed in a sales advertisement. If an

additional 10% discount is given on cash payment, find the total discount available for making purchase by paying cash.

- a) 40.6%
- b) 35.6%
- c) 49.6%
- d) 32.6%

Discount – Answers and Explanation

1) Ans: D

$$\begin{aligned}\text{Sale price at 70\% discount} &= 750 \times (100 - 70)/100 \\ &= 750 \times 30/100 = \text{Rs.}225\end{aligned}$$

2) Ans : C

$$\begin{aligned}\text{Marked price of a shirt} &= \text{Rs. } 800 \\ \text{Discount} &= 20\% \\ \text{Selling price of Shirt} &= [\text{Marked price} \times (100 - \text{Discount \%})]/100 \\ &= [800 \times (100 - 20)]/100 = (800 \times 80)/100 = \text{Rs.}640\end{aligned}$$

3) Ans: B

$$\begin{aligned}\text{According to Question-} \\ \text{Cost price} &= \text{Rs. } 1800 \\ \text{selling price} &= \frac{1800 \times 105}{100} = 1890 \\ \text{Profit} &= \text{Sale Price} - \text{Cost Price} \\ \text{Benefit} &= 1890 - 1800 = \text{Rs.}90\end{aligned}$$

4) Ans: C

$$\begin{aligned}\text{Marked price of article} &= 420 \\ \text{Selling price} &= 350 \\ \text{Discount \%} &= (420 - 350)/420 \times 100 = 70/420 \times 100 \\ &= 16.6\%\end{aligned}$$

5) Ans. D

$$\begin{aligned}\text{Decrease in value from previous year} &= 20\% \\ \text{Last Year Computer Price} &= 32400 \times 100/80 = \\ &= 3240000/80 = \text{Rs.}40500 \\ \text{Hence the value of computer last year} &= \text{Rs.}40500\end{aligned}$$

6) Ans: A

$$x = 50\% \quad y = 20\%$$

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$$\begin{aligned}\text{Profit \%} &= x - y - \frac{xy}{100} \\ &= 50 - 20 - \frac{50 \times 20}{100} \\ &= 30 - 10 \\ &= 20\% \text{ Profit}\end{aligned}$$

7) Ans. C

$$\text{Selling price} = \text{Cost price} [(100 - \text{Discount\%})/100]$$

According to question,

$$\text{Selling price} = \text{Rs. } 499$$

$$\text{Discount \%} = 50\%$$

$$499 = \text{Cost price} [(100-50)]/100$$

$$\text{Cost price} = (499 \times 100)/50 = 499 \times 2 = \text{Rs. } 998$$

8) Ans: A

$$\text{Person has total money} = 10 + 55 = \text{Rs. } 65$$

$$\text{Profit \% or saving\%} = 10/65 \times 100 = 15.3\%$$

9) Ans. D

$$\text{Let Cost price of shirt} = \text{Rs. } x$$

$$\text{Selling price of shirt on Sunday,}$$

$$= x \times \left(1 - \frac{D_1}{100}\right) \left(1 - \frac{D_2}{100}\right) = 144$$

$$\Rightarrow x \times \frac{60}{100} \times \frac{80}{100} = 144 \quad \{D_1 = 40\%, D_2 = 20\%\}$$

$$x = \text{Rs. } 300$$

$$\text{Therefore, the extra money given on Tuesday} =$$

$$300 - 144 = \text{Rs. } 156$$

10) Ans. A

$$\text{Selling price (SP)} = ?$$

$$\text{Marked price} = \text{Rs. } 80$$

$$\text{Discount (D)} = 6\%$$

$$\therefore \text{Selling price} = \text{Marked price} \times \frac{(100 - \text{Discount})}{100}$$

$$\therefore \text{SP} = 80 \times \frac{94}{100}$$

$$\text{SP} = \text{Rs. } 75.2$$

11) Ans. D

According to question,

$$\text{Cost price} \times 130\% = 390$$

$$\text{Cost price} \times 130/100 = 390$$

$$\text{Cost price} = \text{Rs. } 300$$

$$\text{On 20\% Discount, Selling price} = 390 \times 80/100 = 312$$

$$\text{Profit \%} = (\text{Selling price} - \text{Cost price}) \times 100/\text{Cost price}$$

$$= (312 - 300) \times 100/300 = 4$$

12) Ans: A

$$\text{Let Marked price of book is Rs. } 100.$$

$$\text{Then, Cost price} = \text{Rs. } 60$$

$$\text{Selling price} = \text{Rs. } 100$$

$$\text{Profit} = 40/60 \times 100 = 66.6\% \text{ Profit}$$

13) Ans : C

$$\text{Let original price of TV is Rs. } x$$

According to question,

$$x \times 124/100 = 62000$$

$$x = \text{Rs. } 50000$$

14) Ans: A

$$\text{Let Marked price of item} = x \text{ Rs.}$$

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According to question-

$$x \times 90/100 = 900 \times 115/100$$

$$x = 1150$$

Marked price x = Rs. 1150

15) Ans: C

$$\begin{aligned}\text{Discount \%} &= (\text{Marked price} - \text{Selling price}) \\ &\times 100 / \text{Marked price} \\ &= (250 - 225) \times 100 / 250 = 10\%\end{aligned}$$

16) Ans : C

Cost price of first device = Rs.25000

Discount = 10%

$$\text{Selling price} = [\text{Cost price} \times (100 - \text{Discount})] / 100$$

$$\text{Selling price of first device} = [25000 \times (100 - 10)] / 100 = (25000 \times 90) / 100 = \text{Rs. } 22,500$$

Selling price of first device = Rs. 22,500

Cost price of second device = Rs. 75,000

Discount = 20 %

$$\text{Selling price of second device} = [75000 \times (100 - 20)] / 100 = 750 \times 80 = \text{Rs. } 60,000$$

Selling price of second device = Rs. 60,000

$$\begin{aligned}\text{Total Selling price} &= 22,500 + 60,000 \\ &= \text{Rs. } 82500\end{aligned}$$

17) Ans: B

Let, Marked price = Rs. 100

$$\begin{aligned}\text{Selling price after discount} &= 100 \times 25/100 \times \\ &70/100 \times 60/100 = 21/2 = \text{Rs. } 10.5\end{aligned}$$

$$\text{Equivalent discount} = 100 - 10.5 = 89.5\%$$

18) Ans: A

Let Marked price is Rs.100

$$\text{Selling price} = 100 \times (100 - 40) / 100 = 60$$

$$\begin{aligned}\text{Cost price} &= 60 \times 100 / (100 + 26) = 60 \times 100 / 126 = \\ &1000 / 21\end{aligned}$$

$$= \frac{10 \times 100}{21} = \frac{1000}{21}$$

$$\begin{aligned}\text{Marked price} - \text{Cost price} &= 100 - 1000 / 21 = \\ &1100 / 21\end{aligned}$$

$$\begin{aligned}\text{Intended percentage} &= \frac{\frac{1100}{21}}{\frac{1000}{21}} \times 100 = \frac{1100}{1000} \times 100 = \\ &110\%\end{aligned}$$

19) Ans : A

$$\text{Marked price} = (1600 \times 130) / 80 = \text{Rs. } 2600$$

20) Ans: B

Let, Marked price = Rs.x

$$\text{Selling price after 20\% Discount} = x \times 80 / 100$$

$$4800 = x \times 80 / 100$$

$$x = \text{Rs. } 6000$$

$$\begin{aligned}\text{Selling price after 25 \% Discount} &= 6000 \times 75 / 100 \\ &= \text{Rs. } 4500\end{aligned}$$

21) Ans: C

$$\% \text{ Profit/Loss} = 60 - 70 - (60 \times 70) / 100$$

$$= -10 - 42$$

$$= -52\%$$

i.e., Loss of 52%

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22) Ans: C

$$\text{Cost price} = \frac{100}{(100 + \text{Profit}\%)} \times \frac{(100 - \text{Discount}\%)}{100} \times$$

Marked price

$$= 100/113 \times 80/100 \times 2260 = \text{Rs.}1600$$

23) Ans: C

$$\text{Profit}\% = 40 - 20 - (40 \times 20)/100$$

$$= 20 - 8 = 12\%$$

24) Ans: C

Let Original price of product = Rs.x

Selling price after successive Discount = Rs.480

$$x \times (30/100) \times (80/100) = 480$$

$$x = 2000$$

25) Ans: B

$$\text{Discount \%} = (70 - 56)/70 \times 100$$

$$= 14/70 \times 100 = 20\%$$

26) Ans: B

Let, Marked price of mobile phone = x

$$\text{Cost price} = x \times 50/100 = x/2$$

$$\therefore \text{Selling price} = [(100 + 35)/100] \times x/2$$

$$40500 = 135/100 \times x/2$$

$$x = (40500 \times 100 \times 2)/135$$

$$= \text{Rs.}60000$$

27) Ans: B

Let, Cost price = Rs.100

\therefore Marked price = Rs. 150

So she can give a discount of Rs. 50.

$$\% \text{ Discount} = 50 \times 100/150 = 33.33\%$$

28) Ans: C

$$\text{MP} \times [(100 - \text{discount}\%)/100] = \text{SP}$$

$$\text{MP} \times 40/100 = 400$$

$$\text{MP} = (400 \times 100)/40$$

$$\text{MP} = 1000$$

$$\text{CP} = \text{SP} \times 100/(100 + 25)$$

$$\text{CP} = 400 \times 100/125$$

$$\text{CP} = 320$$

$$\text{Profit} = 1000 - 320 = 680$$

$$\text{Profit \%} = 680/320 \times 100 = 212.5\%$$

29) Ans: C

Let First Discount = D_1 %

By question,

$$500 \times \left(\frac{100 - D_1}{100} \right) \left(\frac{100 - D_2}{100} \right) = 180$$

$$\Rightarrow 500 \left(\frac{100 - D_1}{100} \right) \times \left(\frac{100 - 10}{100} \right) = 180$$

$$\Rightarrow (100 - D_1) = \frac{180 \times 100 \times 100}{500 \times 90}$$

$$\Rightarrow (100 - D_1) = 40$$

$$D_1 = 100 - 40 = 60\%$$

So, First Discount = 60%

30) Ans: B

$$\text{Cost price of bicycle} = 2000 \times 90/100 \times 85/100 = \text{Rs.}1530$$

$$\text{Price of bicycle including repair} = 1530 + 70 = \text{Rs.}1600$$

$$\text{And Selling price} = \text{Rs.}2000$$

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$$\therefore \text{Profit}\% = \text{Profit}/\text{Cost price} \times 100 = 400/1600 \times 100 = 25\%$$

31) Ans: A

Let, Cost price = Rs.100

\therefore Marked price = Rs. 140

Selling price on 20% Profit = Rs. 120

\therefore Discount % = $20/140 \times 100 = 14.29\%$

32) Ans: B

Selling price after 20% Discount = $640 \times (100 - 20)/100 = (640 \times 80)/100 = \text{Rs.}512$

Thus, the cost of the item for 25% Profit = $[512/(100 + 25)] \times 100 = 512/125 \times 100 = \text{Rs.}409.60$

33) Ans: C

Let, Cost price = Rs.100

Then, Marked price = $100 \times 125/100 = 125$

Selling price after 20% Discount = $125 \times 80/100 = 100$

So, Profit = $100 - 100 = 0\%$

34) Ans: C

Total value of small copy = $5 \times 12 \times 10 = 600$

Total value of big copy = $10 \times 12 \times 15 = 1800$

\therefore Discount = $(600+1800) \times 5/100 = \text{Rs. } 120$

35) Ans: A

Price of an item = $8400/40 = 210$

Marked price of an item = $(210 \times 100)/70 = \text{Rs.}300$

36) Ans: B

Cost price = $2000 \times 90/100 \times 85/100 = \text{Rs.}1530$

Total price including packing = $1530 + 70 = \text{Rs.}1600$

Selling price = Rs.2000

Profit % = $(400/1600) \times 100\% = 25\%$

37) Ans: A

Marked price of store-bought TV = $16000 \times 100/80 = 20000$

Marked price of online-bought TV = $15725 \times 100/85 = 18500$

Difference = $20000 - 18500 = \text{Rs.}1500$

38) Ans: C

Marked price = $5445 \times 100/(100-10)$
 $= 5445 \times 100/90 = \text{Rs. } 6050$

39) Ans: B

Cost price = $1000 \times 90/100 \times 85/100 = \text{Rs.}765$

Total cost = $765 + 35 = 800$

Selling price = 1000

% Profit = $200/800 \times 100 = 25\%$

40) Ans: C

Marked price = 625

Selling price = Rs.425

Discount = $[(625 - 425)/625] \times 100 = 32\%$

41) Ans: A

Selling price = $420 \times 80/100 = 336$

\therefore Cost price = $[100/(100 + \text{Profit})] \times \text{Selling price}$

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$$\text{Cost price} = 100/125 \times 336 = \text{Rs. } 268.8$$

42) Ans: A

Let, Cost price = 100

Profit = 17%

Then, Selling price = 117

Discount = 22 %

Marked price = $117 \times 100/78 = 150$

So, marked price should be 50% more than Cost price.

43) Ans: C

SP = Rs.1680

$$\text{CP} = 1680 \times \frac{100}{84} = \text{Rs. } 2000$$

$$\text{SP} = \frac{\text{MP}(100 - D)}{100}$$

{Where, MP = Marked price , SP = Selling price,
CP = Cost price, D = Discount}

$$\frac{\text{CP} \times (100 + P)}{100} = \frac{\text{MP}(100 - D)}{100}$$

$$2000 \times 115 = \text{MP} \times 92$$

$$\text{MP} = \frac{2000 \times 115}{92} = \text{Rs. } 2500$$

44) Ans: B

Let initial price of that item = Rs.x

According to question,

$$x \times 90/100 \times 90/100 \times 90/100 = 25515$$

$$x = \text{Rs. } 35000$$

45) Ans: A

(1) 20% and 30% gradual discount.

$$= 20 + 30 - \frac{30 \times 20}{100} = 50 - 6 = 44\%$$

(2) 30% and 20% gradual discount.

$$= 30 + 20 - \frac{30 \times 20}{100} = 50 - 6 = 44\%$$

Therefore, it is clear that both are equal.

46) Ans: C

Marked price = Rs.150

Selling price after two successive discount of 10% = $150 \times 90/100 \times 90/100 = \text{Rs. } 121.5$

47) Ans: A

Marked price = 195,

Selling price = 17.55

First Discount $D_1 = 10\%$, Second Discount $D_2 = ?$

Formula-

$$\text{Marked price} \times \frac{(100 - D_1)}{100} \times$$

$$\frac{(100 - D_2)}{100} = \text{Selling price}$$

$$195 \times \frac{(100 - 10)}{100} \times \frac{(100 - D_2)}{100} = 17.55$$

$$\frac{195 \times 90}{100} \times \frac{(100 - D_2)}{100} = 17.55$$

$$(100 - D_2) = \frac{17.55 \times 1000}{195 \times 9}$$

$$(100 - D_2) = 10$$

$$100 - D_2 = 10$$

$$100 - 10 = D_2$$

$$90 = D_2$$

So, Second Discount $D_2 = 90\%$

48) Ans: A

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$$\text{Selling price} = 4000 \times 90/100 \times 80/100$$

$$= 4000 \times 9/10 \times 4/5 = \text{Rs. } 2880$$

49) Ans: B

Let original price of sugar = x

$$\text{Price after 25\% reduction} = x \times \frac{75}{100} = \frac{3x}{4}$$

According to question,

$$\frac{30}{3x/4} - \frac{30}{x} = 1$$

$$(120 - 90)/3 = x$$

$$x = \text{Rs. } 10$$

50) Ans: C

Equivalent discount of two successive 20% and 30%

$$= -20 - 30 + \frac{20 \times 30}{100}$$

$$= -50 + 6 = -44\%$$

Again, Total discount after 10% new discount

$$-44 - 10 + \frac{-44 \times -10}{100}$$

$$-54 + 4.4 = -49.6\%$$

Therefore, a discount of 49.6% will be available.

Number Series

Direction (01 – 16): which of the following will replace (?) in the series?

1) ? , 134 , 156 , 188 , 231

a) 120

b) 121

c) 110

d) 99

2) 19 , 140 , 309 , 598 , 959 , ?

a) 1021

b) 781

c) 956

d) 1488

3) 12 , 26 , 81 , 328 , 1645 , ?

a) 9876

b) 1564

c) 1640

d) None of these

4) ? , 2.5 , 7 , 21.5 , 72.5 , 269.75

a) 2

b) 0

c) 1.5

d) 1

5) ? , 9 , 21 , 38 , 60

a) 0

b) 2

c) 1

d) 5

6) 8751 , 9089 , 9596 , 10272 , ? , 12131

a) 12117

b) 11117

c) 12017

d) 12002

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7) ? , 606 , 655 , 719 , 800 , 900

- a) 500
- b) 600
- c) 550
- d) 570

8) ? , 150 , 350 , 1500 , 12150 , 194600

- a) 100
- b) 150
- c) 250
- d) 200

9) ? , 187 , 2079 , 22902 , 251966

- a) 16
- b) 15
- c) 20
- d) 17

10) ? , 2 , 6 , 42 , 1806

- a) 2
- b) 1
- c) 0
- d) 4

11) ? , 12 , 28 , 90 , 368 , 1850

- a) 4
- b) 10
- c) 6
- d) 12

12) 12 , 7 , ? , 22 , 96 , 784

- a) 11

b) 6

c) 9

d) 8

13) 100 , 118 , ? , 226 , 370 , 658

- a) 154
- b) 134
- c) 151
- d) 180

14) 100 , ? , 50 , 75 , 150 , 375

- a) 50
- b) 100
- c) 150
- d) 200

15) 160 , 172 , 192 , 220 , 256 , ?

- a) 320
- b) 300
- c) 296
- d) 312

16) 62 , 70 , 61 , 125 , ? 316

- a) 75
- b) 300
- c) 125
- d) 100

Direction (17- 25) In the below series find which term is wrong.

17) 1371 , 1404 , 1439 , 1477 , 1519 , 1568

- a) 1568

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b) 1371

c) 1519

d) 1477

18) 480 , 961 , 2887 , 14444 , 101112

a) 14444

b) 101112

c) 960

d) None of these

19) 1330 , 2114 , 3014 , 4038 , 5263

a) 5263

b) 1330

c) 2114

d) 3014

20) 160 , 176 , 387.5 , 1703.68 , 11244.28

a) 160

b) 387.5

c) 1703.68

d) 11244.28

21) 2310 , 210 , 30 , 6 , 3 , 1

a) 1

b) 3

c) 6

d) 30

22) 21 , 22 , 46 , 141 , 568 , 2840

a) 141

b) 21

c) 2840

d) 568

23) 144 , 2197 , 196 , 3375 , 216 , 4903

a) 4903

b) 3375

c) 196

d) 1331

24) 32 , 16 , 17 , 36 , 172 , 448

a) 32

b) 17

c) 56

d) 172

25) 1234 , 1246 , 1264 , 1287 , 1318 , 1354

a) 1234

b) 1287

c) 1264

d) 1246

Direction (26 – 40): which of the following will replace (?) in the series?

26) 2, 15, 41, 80, 132, ?

a) 171

b) 185

c) 197

d) None of these

27) ?, 10, 18, 44, 124, 366

a) 7

b) 8

c) 9

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d) None of these

28) 18, 55, 167, 504, ?, 4553

a) 1516

b) 1542

c) 1485

d) 1625

29) 279, 294, 324, 369, 429, ?

a) 484

b) 528

c) 514

d) 504

30) 840, 840, 420, 140, 35, ?

a) 7

b) 5

c) 1

d) 4

31) 4, 19, 49, 109, ?

a) 217

b) 215

c) 189

d) 229

32) 2, 60, 10, 120, 30, ?

a) 216

b) 210

c) 250

d) 312

33) 7, 5, 7, 17, 63, ?

a) 315

b) 309

c) 125

d) None of these

34) 48, 23, ?, 4.25, 1.125

a) 8.5

b) 12.0

c) 12.5

d) 10.5

35) ?, 50, 108, 232, 496, 1056

a) 23

b) 25

c) 15

d) 10

36) 11, 14, 19, 28, 43, ?

a) 13

b) 10

c) 14

d) 11

37) 5, 15, 75, 525, ?, 51975

a) 4515

b) 4170

c) 4520

d) 4725

38) 13, ?, 61, 121, 205, 313

a) 25

b) 50

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c) 20

d) 45

39) 10, 26, 50, 110, 320, ?

a) 1265

b) 1250

c) 1200

d) 1240

40) 8, 6, 8, 14, 30, ?

a) 85

b) 70

c) 77

d) 75

Direction (41-50) Find the wrong term in the given series.

41) 14, 12, 21, 59, 230, 1149

a) 230

b) 59

c) 21

d) 12

42) 1500, 771, 528, 447, 420, 412

a) 420

b) 529

c) 412

d) 1500

43) 1, 730, 975, 1054, 1081

a) 975

b) 1

c) 730

d) 1054

44) 4, 6, 12, 30, 60

a) 30

b) 12

c) 4

d) 60

45) 10, 20, 50, 120, 248

a) 50

b) 120

c) 20

d) 10

46) 11, 20, 32, 60, 116

a) 60

b) 116

c) 20

d) 32

47) 7, 9, 21, 67, 275

a) 9

b) 67

c) 21

d) 275

48) 3, 6, 15, 45, 157

a) 157

b) 45

c) 15

d) 6

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49) 825 , 850 , 900 , 1010 , 1200 , 1600

- a) 1600
- b) 1010
- c) 900
- d) 850

50) 120, 300, 1050, 4720

- a) 1050
- b) 120
- c) 300
- d) 4720

Number Series – Answer and Explanation

1) Answer: B

Solution:

x	134	156	188	231
	13	22	32	43
	9	10	11	

The pattern is double difference of 1

$134 - 13 = 121$

2) Answer: D

Solution:

19	140	309	598	959	1488
	121	169	289	361	529
	11^2	13^2	17^2	19^2	23^2

So, the pattern is square of prime numbers starting from 11.

$? = 959 + 23^2$

$? = 959 + 529$

$? = 1488$

3) Answer: A

Solution:

$12 \times 2 + 2 = 26$

$26 \times 3 + 3 = 81$

$81 \times 4 + 4 = 328$

$328 \times 5 + 5 = 1645$

$1645 \times 6 + 6 = 9876$

4) Answer: D

Solution:

$1 \times 15 + 1 = 2.5$

$2.5 \times 2 + 2 = 7$

$7 \times 2.5 + 4 = 21.5$

$21.5 \times 3 + 8 = 72.5$

5) Answer: B

2	9	21	38	60
7	12	17	22	
5	5	5		

Difference of difference is 5

6) Answer: B

Solution:

8751	,	9089	,	9596	,	10272	,	?	,	12131
		338		507		676		845		1014
		169		169		169		169		

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The series is difference of difference = 169

$$? = 10272 + 845 = 11117$$

7) Answer: D

Solution:

$$\frac{?}{36}, \frac{606}{49}, \frac{655}{64}, \frac{719}{81}, \frac{800}{100}, \frac{900}{100}$$

The above series is of square of a number starting from 6.

$$? = 606 - 36$$

$$? = 570$$

8) Answer: A

Solution:

$$\frac{?}{X1.5+0}, \frac{150}{X2+50}, \frac{350}{X4+100}, \frac{1500}{X8+150}, \frac{12150}{X16+200}, \frac{194600}{X32+250}$$

$$? = 150/1.5$$

$$? = 100$$

9) Answer: A

Solution:

According to the question

$$\frac{?}{X11+11}, \frac{187}{X11+22}, \frac{2079}{X11+33}, \frac{22902}{X11+44}, \frac{251966}{X11+55}$$

$$? X 11 + 11 = 187$$

$$? = 16$$

10) Answer: B

Solution:

$$?, 2, 6, 42, 1806$$

$$\times 1+1 \quad \times 2+2 \quad \times 6+6 \quad \times 42+42$$

$$? X 1 + 1 = 2$$

$$? = 1$$

11) Answer: B

Solution:

$$? X 1 + 2 = 12$$

$$? = 10$$

12) Answer: C

Solution:

$$12, 7, ?, 22, 96, 784$$

$$\times .5+1 \quad \times 1+2 \quad \times 2+4 \quad \times 4+8 \quad \times 8+16$$

$$? \times 2 + 4 = 22$$

$$? = 9$$

13) Answer: A

Solution:

$$100 \quad 118 \quad ? \quad 226 \quad 370 \quad 658$$

$$18 \quad 36 \quad 72 \quad 144 \quad 288$$

The series pattern is Number difference is twice than the previous ..

$$? = 118 + 36 = 154$$

14) Answer: A

Solution:

$$\frac{100}{\times 0.5}, \frac{?}{\times 1.0}, \frac{50}{\times 1.5}, \frac{75}{\times 2.0}, \frac{150}{\times 2.5}, \frac{375}{\times 3.0}$$

$$100 \times 0.5 = ?$$

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$$? = 50$$

15) Answer: B

Solution:

$$\begin{array}{cccccc} 160 & 172 & 192 & 220 & 256 & ? \\ \hline 12 & 20 & 28 & 36 & 44 & \\ \hline +8 & +8 & +8 & +8 & & \end{array}$$

$$? = 256 + 44 = 300$$

16) Answer: D

Solution:

$$\begin{array}{cccccc} 62 & 70 & 61 & 125 & ? & 316 \\ \hline +8 & -9 & +64 & -25 & +216 & \\ \hline \end{array}$$

$$? = 125 - 25$$

$$? = 100$$

17) Answer: A

Solution: According to the question.

$$\begin{array}{cccccc} 1371 & 1404 & 1439 & 1477 & 1519 & 1568 \\ & 33 & 35 & 38 & 42 & 49 \\ & & 2 & 3 & 4 & 7 \end{array}$$

So, the above series is of double difference, pattern - 2, 3, 4, 5 and so.

Wrong number is 7 and it must be replaced by 5.

Wrong number is 1568

18) Answer: B

Solution: According to the question.

$$\begin{array}{cccc} 480 & 961 & 2887 & 14444 & 101112 \\ \hline \times 2 + 1 & \times 3 + 4 & \times 5 + 9 & \times 7 + 4 & \end{array}$$

So the pattern is -

Multiplication by prime + square of 1,2,3 so on.

So the error part is $14444 \times 7 + 16 = 101124$ is the correct term.

19) Answer: A

Solution: According to the question.

$$\begin{array}{cccccc} 1330 & 2114 & 3014 & 4038 & 5194 \\ & 28^2 & 30^2 & 32^2 & 34^2 \end{array}$$

So 5263 term is wrong.

20) Answer: D

Solution:

According to the question.

$$\begin{array}{cccc} 160 & 176 & 387.5 & 1703.68 & 11244.28 \\ \hline 1.1 & 2.2 & 4.4 & 6.6 & \end{array}$$

So the series is of pattern -

$\times 1.1$, $\times 2.2$, $\times 4.4$ and so on.

So the wrong part is $\times 6.6$ it must be $\times 8.8$ due to which 11244.88 term is wrong.

21) Answer: B

Solution: According to the question.

$$\begin{array}{cccccc} 2310 & 210 & 30 & 6 & 3 & 1 \\ \hline \div 11 & \div 7 & \div 5 & \div 3 & \div 2 & \end{array}$$

So the pattern of the series division by prime number in decreasing format.

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$$6 \div 3 = 2$$

$$2 \div 2 = 1$$

So the wrong part is 3.

22) Answer: C

Solution:

$$\begin{array}{r} 21 \quad 22 \quad 46 \quad 141 \quad 568 \quad 2840 \\ \hline x1+1 \quad x2+2 \quad x3+3 \quad x4+4 \quad x5+5 \end{array}$$

$$568 \times 5 + 5 = 2845$$

So, 2840 is wrong term.

23) Answer: A

Solution:

$$\begin{array}{r} 144 \quad 2197 \quad 196 \quad 3375 \quad 216 \quad 4903 \\ \hline 12 \times 12 \quad 13 \times 13 \times 13 \quad 14 \times 14 \quad 15 \times 15 \times 15 \quad 16 \times 16 \quad 17 \times 17 \times 17 \end{array}$$

$$17 \times 17 \times 17 = 4913$$

So, 4903 is wrong term.

24) Answer: D

Solution:

$$32 * .5 + 0 = 16$$

$$16 * 1 + 1 = 17$$

$$17 * 2 + 2 = 36$$

$$36 * 3 + 3 = 111$$

$$111 * 4 + 4 = 448$$

$$36 \times 3 + 3 = 111$$

So, 172 is wrong term.

25) Answer: B

Solution:

$$\begin{array}{r} 1234 \quad 1246 \quad 1264 \quad 1287 \quad 1318 \quad 1354 \\ \hline +12 \quad +18 \quad +24 \quad +30 \quad +36 \\ \hline +6 \quad +6 \quad +6 \quad +6 \end{array}$$

$$1264 + 24 = 1288$$

So, 1287 is wrong term.

26) Answer: C

Solution: According to the question.

$$\begin{array}{r} 2 \quad , \quad 15 \quad , \quad 41 \quad , \quad 80 \quad , \quad 132 \quad , \quad 197 \\ +13 \quad +26 \quad +39 \quad +52 \quad +65 \end{array}$$

27) Answer: B

Solution: According to the question.

$$8, 10, 18, 44, 124, 366$$

The pattern of the number series is -

$$8 + 2 = 10$$

$$10 + 8 (3 \times 2 + 2) = 18$$

$$18 + 26 (3 \times 8 + 2) = 44$$

$$44 + 80 (3 \times 26 + 2) = 124$$

$$124 + 242 (3 \times 80 + 2) = 366$$

28) Answer: A

Solution: According to the question.

$$\begin{array}{r} 18 \quad , \quad 55 \quad , \quad 167 \quad , \quad 504 \quad , \quad ? \quad , \quad 4553 \\ x3+1 \quad x3+2 \quad x3+3 \quad x3+4 \quad x3+5 \end{array}$$

$$? \times 3 + 5 = 4553$$

$$? = 1516$$

29) Answer: D

Solution: According to the question.

$$\begin{array}{r} 279 \quad , \quad 294 \quad , \quad 324 \quad , \quad 369 \quad , \quad 429 \quad , \quad ? \\ +15 \quad +30 \quad +45 \quad +60 \quad +75 \end{array}$$

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$$429 + 75 = 504$$

30) Answer: A

Solution: According to the question.

$$\begin{array}{cccccc} 840 & , & 840 & , & 420 & , & 140 & , & 35 & , & ? \\ \div 1 & & \div 2 & & \div 3 & & \div 4 & & \div 5 & & \end{array}$$

$$35 \div 5 = 7$$

31) Answer: D

Solution: According to the question.

$$\begin{array}{cccccc} 4 & , & 19 & , & 49 & , & 109 & , & ? \\ +15 & & +30 & & +60 & & +120 & & \end{array}$$

$$109 + 120 = 229$$

32) Answer: B

Solution: According to the question.

$$\begin{array}{cccccc} 2 & , & 60 & , & 10 & , & 120 & , & 30 & , & ? \\ 1^3+1 & & 4^3-4 & & 2^3+2 & & 5^3-5 & & 3^3+3 & & 6^3-6 \\ 6^3 - 6 = 210 \end{array}$$

33) Answer: B

Solution: According to the question.

$$\begin{array}{cccccc} 7 & , & 5 & , & 7 & , & 17 & , & 63 & , & ? \\ 1-2, & & \times 2-3, & & \times 3-4, & & \times 4-5, & & \times 5-6 \\ 63 \times 5 - 6 = 309 \end{array}$$

34) Answer: D

Solution: According to the question.

$$\begin{array}{cccccc} 48 & , & 23 & , & ? & , & 4.25 & , & 1.125 \\ \div 2 - 1, & & \div 2 - 1, & & \div 2 - 1, & & \div 2 - 1, & & \div 2 - 1 \\ 23 \div 2 - 1 = 10.5 \end{array}$$

35) Answer: A

Solution: According to the question.

$$\begin{array}{cccccc} ? & , & 50 & , & 108 & , & 232 & , & 496 & , & 1056 \\ x2+4 & & x2+8 & & x2+16 & & x2+32 & & x2+64 \end{array}$$

$$? \times 2 + 4 = 50$$

$$? = 23$$

36) Answer: D

Solution: According to the question.

$$\begin{array}{cccccc} ? & , & 14 & , & 19 & , & 28 & , & 43 & , & 66 \\ +3, & & +5, & & +9, & & +15 & & +23 \\ +2, & & +4, & & +6 & & +8 \end{array}$$

$$? + 3 = 11$$

37) Answer: D

Solution: According to the question.

$$\begin{array}{cccccc} 5 & , & 15 & , & 75 & , & 525 & , & ? & , & 51975 \\ x3 & & x5 & & x7 & & x9 & & x11 \end{array}$$

$$525 \times 9 = 4725$$

38) Answer: A

Solution: According to the question.

$$\begin{array}{cccccc} 13 & , & ? & , & 61 & , & 121 & , & 205 & , & 313 \\ +12 & & +36 & & +60 & & +84 & & +108 \\ +24 & & +24 & & +24 & & +24 \end{array}$$

$$13 + 12 = 25$$

39) Answer: A

Solution: According to the question.

$$\begin{array}{cccccc} 10 & , & 26 & , & 50 & , & 110 & , & 320 & , & ? \\ 16 & & 24 & & 60 & & 210 & & 945 \end{array}$$

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$$\begin{array}{cccc} \times 1.5 & \times 2.5 & \times 3.5 & \times 4.5 \end{array}$$

$$320 + 945 = 1265$$

40) Answer: C

Solution: According to the question.

$$8, 6, 8, 14, 30, ?$$

$$\begin{array}{ccccc} \times 0.5 + 2 & \times 1 + 2 & \times 1.5 + 2 & \times 2 + 2 & \times 2.5 + 2 \end{array}$$

$$30 \times 2.5 + 2 = 77$$

41) Answer: A

Solution: According to the question.

$$14, 12, 21, 59, 230, 1149$$

$$\begin{array}{ccccc} \times 1 - 2 & \times 2 - 3 & \times 3 - 4 & \times 4 - 5 & \times 5 - 6 \end{array}$$

$$59 \times 4 - 5 = 231$$

42) Answer: C

Solution: According to the question.

$$1500, 771, 528, 447, 420, 412$$

$$\begin{array}{ccccc} -729 & -243 & -81 & -27 & -9 \end{array}$$

$$420 - 9 = 411$$

43) Answer: A

Solution: According to the question.

$$1, 730, 975, 1054, 1081$$

$$\begin{array}{cccc} +729 & +243 & +81 & +27 \end{array}$$

$$730 + 243 = 973$$

44) Answer: D

Solution: According to the question.

$$4, 6, 12, 30, 60$$

$$\begin{array}{cccc} \times 1.5 & \times 2 & \times 2.5 & \times 3 \end{array}$$

$$30 \times 3 = 90$$

45) Answer: B

Solution: According to the question.

$$10, 20, 50, 120, 248$$

$$\begin{array}{cccc} +10 & +30 & +68 & +130 \end{array}$$

$$\begin{array}{cccc} 2^3 + 2 & 3^3 + 3 & 4^3 + 4 & 5^3 + 5 \end{array}$$

$$50 + 68 = 118$$

46) Answer: C

Solution: According to the question.

$$11, 20, 32, 60, 116$$

$$\begin{array}{cccc} \times 2 - 2^2 & \times 2 - 2^2 & \times 2 - 2^2 & \times 2 - 2^2 \end{array}$$

$$? \times 2 - 4 = 32$$

$$? = 18$$

47) Answer: D

Solution: According to the question.

$$7, 9, 21, 67, 275$$

$$\begin{array}{cccc} \times 1 + 2 & \times 2 + 3 & \times 3 + 4 & \times 4 + 5 \end{array}$$

$$67 \times 4 + 5 = 273$$

48) Answer: A

Solution: According to the question.

$$3, 6, 15, 45, 157$$

$$\begin{array}{cccc} \times 2 & \times 2.5 & \times 3 & \times 3.5 \end{array}$$

$$45 \times 3.5 = 157.5$$

49) Answer: B

Solution: According to the question.

$$825, 850, 900, 1010, 1200, 1600$$

$$\begin{array}{ccccc} +25 & +50 & +100 & +200 & +400 \end{array}$$

$$900 + 100 = 1000$$

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50) Answer: D

Solution: According to the question.

120 , 300 , 1050 , 4720

x2.5

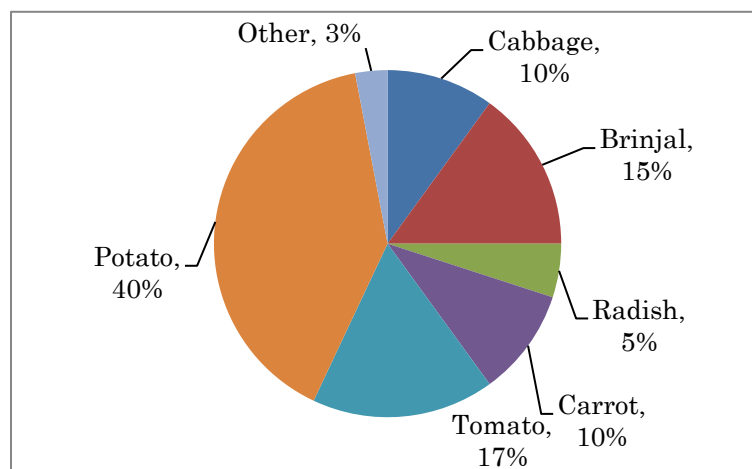
x3.5

x4.5

$$1050 \times 4.5 = 4725$$

Data Interpretation

Direction (01–04): The pie chart below shows the distribution of land for various vegetables in a village for a total cultivation area of 3000 acres. Answer the questions below based on the share of different vegetables as shown in the chart below.



1. What is the cultivation area for Tomato?

- a) 540 Acre
- b) 510 Acre
- c) 480 Acre
- d) 490 Acre

2. What is the total cultivation area under the vegetables Potato and Brinjal ?

- a) 1650 Acre
- b) 1830 Acre
- c) 1800 Acre
- d) 1860 Acre

3. Radish, Tomato and Cabbage together account for how much cultivation area of the village?

- a) 930 Acre
- b) 990 Acre
- c) 950 Acre
- d) 960 Acre

4. How much cultivation area is covered under Carrot and Tomato?

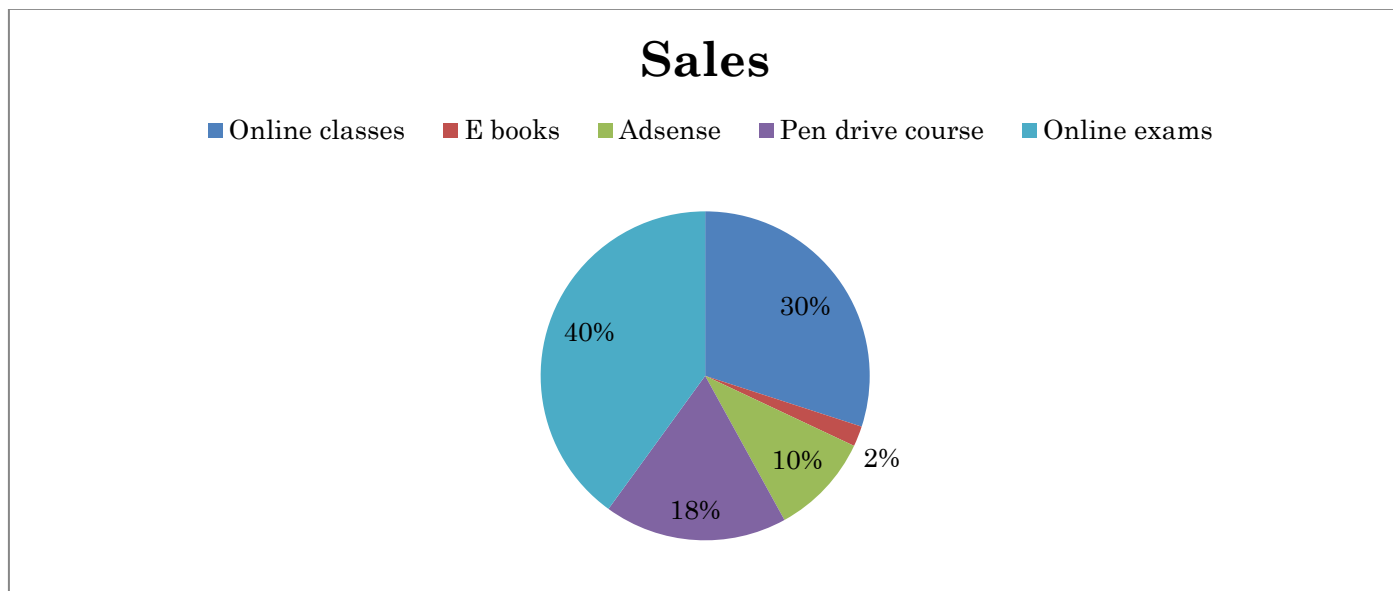
- a) 840 Acre
- b) 870 Acre

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c) 810 Acre

d) 960 Acre

Direction (5 – 8): IBPS Guide collected Rs. 200 crores of funds from different sources. Answer the questions below based on the fund collection from different sources as given in the pie chart below.



5. What is the amount of fund collected through Ebooks and Adsense together?

- a) Rs. 20 Crore
- b) Rs. 30 Crore
- c) Rs. 24 Crore
- d) Rs. 27 Crore

6. How much amount is collected from Pendrive Courses?

- a) Rs. 36 Crore
- b) 18 Crore
- c) Rs. 30 Crore

d) Rs. 40 Core

7. What is the difference between the amount collected from Online exams and Online classes?

- a) Rs. 60 Crore
- b) Rs. 100 Crore
- c) Rs. 10 Crore
- d) Rs. 20 Crore

8. If one-fifth of the fund collected from Adsense is invested in research development facilities at IBPS Guide, how much total amount is

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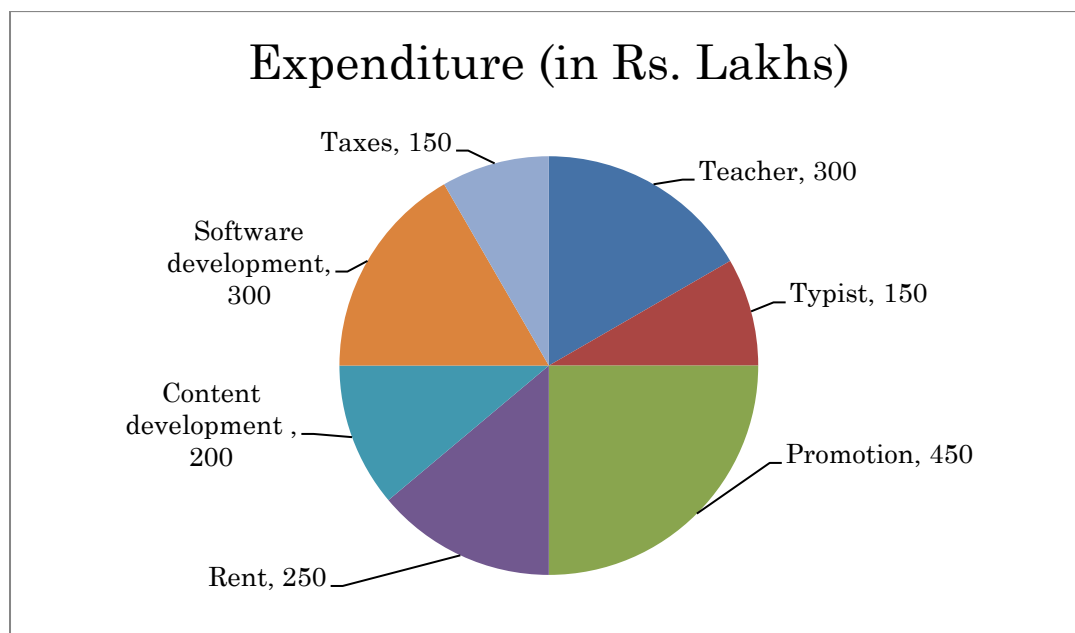
invested in research development facilities?

- a) Rs. 9 Crore
- b) Rs. 4 Crore

c) Rs. 6 Crore

d) Rs. 12 Crore

Direction (9–12): The pie chart shows the breakup of expenditure of IBPS Guide for the year 2020. Study the diagram and answer the following questions.



9. The highest expenditure is for which category?

- a) Rent
- b) Promotion
- c) Content development
- d) Software development

10. What is the total expenditure (in Rs. lakhs)?

- a) 1800
- b) 1900
- c) 1200
- d) 1100

11. The measure of the central angle of the sector representing Teacher is _____ degrees.

- a) 50
- b) 55
- c) 65
- d) 60

12. Expenditure on Content development and Software development constitute what percent of total expenditure?

- a) 13.33%

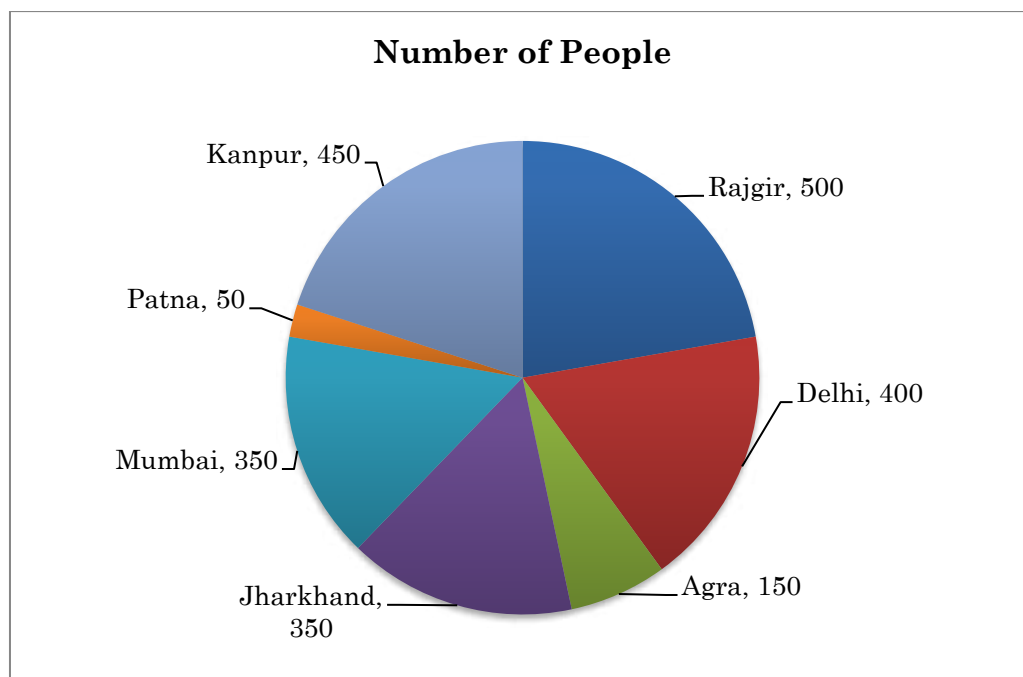
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b) 12.25%

c) 33.33%

d) 27.77%

Direction (13–16): The pie chart shows the results of an online survey which asked people about their favourite travel destination. Study the diagram and answer the following question.



13. Which travel destination is the favourite of most people surveyed?

- a) Delhi
- b) Kanpur
- c) Jharkhand
- d) Rajgir

14. What is the total number of people who have responded to the survey?

- a) 1850

b) 2350

c) 2250

d) 1950

15. The measure of the central angle of the sector representing number of people whose favorite travel destination is Patna is _____ (in degree).

a) 11

b) 13

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c) 17

d) 8

16. Respondents who said their favourite travel destination is Rajgir and those who said their favourite travel destination is Delhi constitute

what percent of the total respondents?

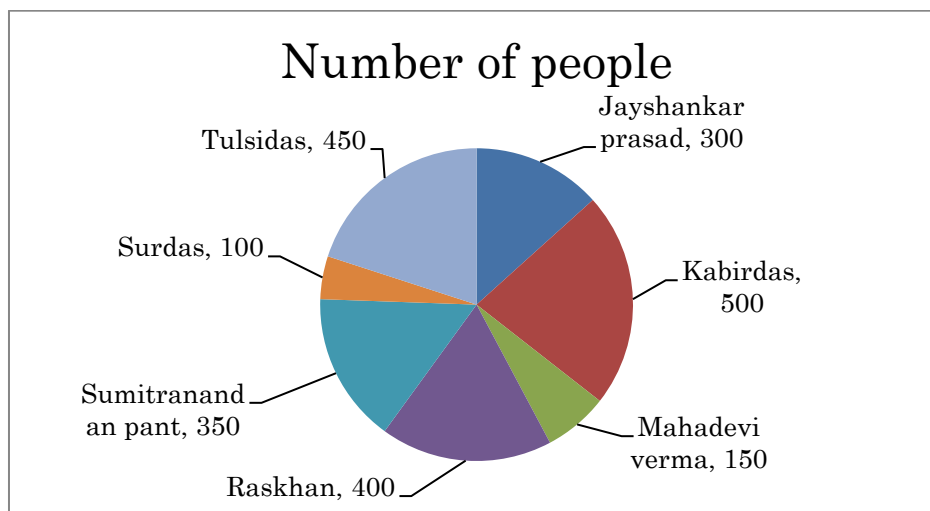
a) 55%

b) 33%

c) 20%

d) 40%

Direction(17–20): The pie chart shows the results of an online survey which asked people about their favourite author. Study the diagram and answer the following question



17. Which author is the favourite of most people surveyed?

a) Surdas

b) Kabirdas

c) Raskhan

d) Sumitranandan pant

18. Respondents who said their favourite author is Jayshankar Prasad and those who said their

favourite author is Kabirdas constitute what percent of the total respondents?

a) 35.30%

b) 12.20%

c) 34.44%

d) 35.55%

19. The measure of the central angle of the sector representing number of people whose

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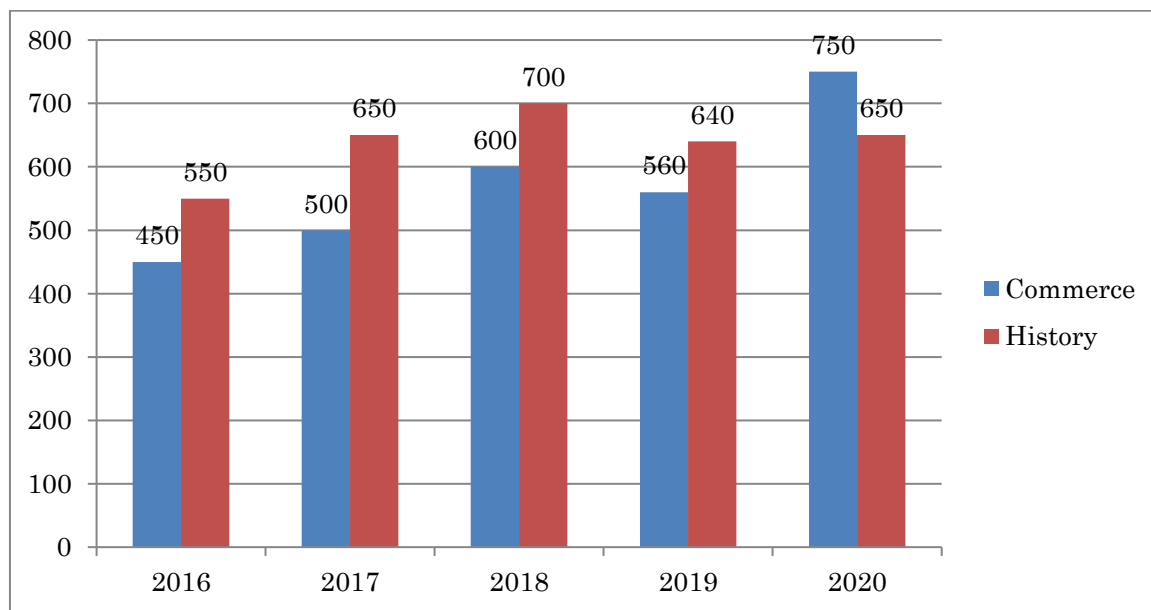
favourite author is Raskhan is _____ degrees.

- a) 50
- b) 64
- c) 66
- d) 62

20. What is the total number of people who have responded to the survey?

- a) 2250
- b) 2300
- c) 2450
- d) 2500

Direction (21 – 24): The given bar graph represents the number of students from commerce and history streams from a school in different years.



21. In which year the number of history students is 30% more than that of commerce?

- a) 2020
- b) 2018
- c) 2017
- d) 2019

22. The total number of history students in 2016, 2018 and 2020 is what percentage less than that of commerce in the given five years (correct to one decimal place)?

- a) 23.2%
- b) 33.6%
- c) 35.4%

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d) 37.8%

23. The average number of commerce students in 2016, 2018 and 2020 is what percentage more than the number of history students in 2016?

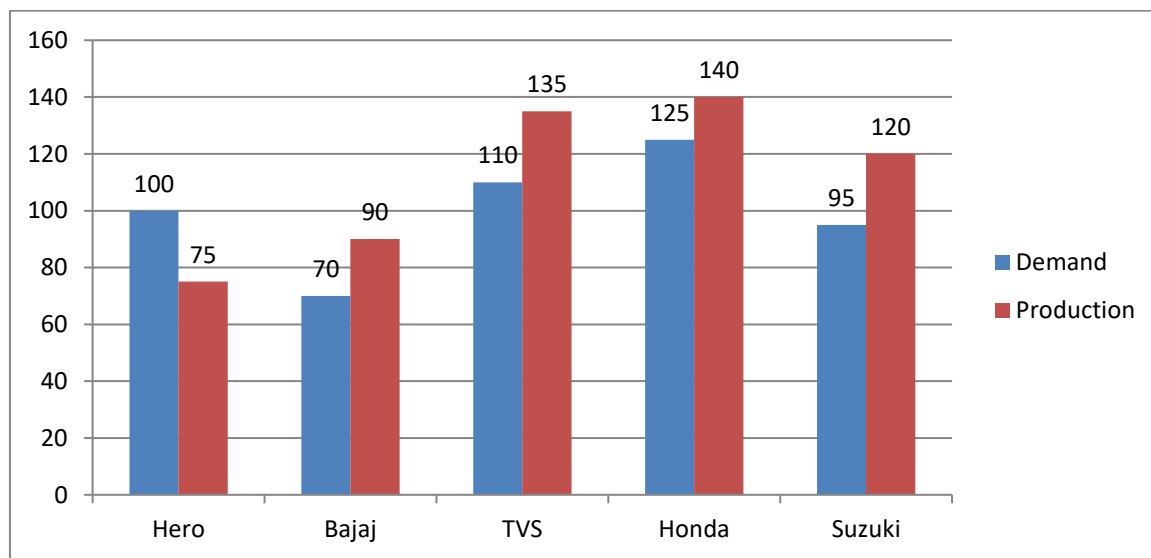
a) $13\frac{1}{9}\%$
b) $29\frac{1}{1}\%$
c) $9\frac{1}{11}\%$

d) $78\frac{1}{9}\%$

24. What is the ratio of the total number of commerce students in 2016 and 2020 to that of history in 2017 and 2020?

a) 19 : 20
b) 18 : 19
c) 12 : 13
d) 10 : 11

Direction: (25 - 28): The given Bar graph represents the demand and Production of motorcycles of five companies (in lakhs).



25. The average Production of motorcycles of companies Bajaj, TVS and Suzuki taken together is what percent less than the demand of motorcycles of company Honda?

a) 8%
b) 6.7%

c) 7.3%
d) 5.6%

26. Which company has the Production of motorcycles approximately 23% more than the demand?

a) Bajaj

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- b) TVS
- c) Honda
- d) Suzuki

27. The total Production of motorcycles of companies Bajaj and Honda taken together is what percent of the demand of motorcycles of all the companies taken together?

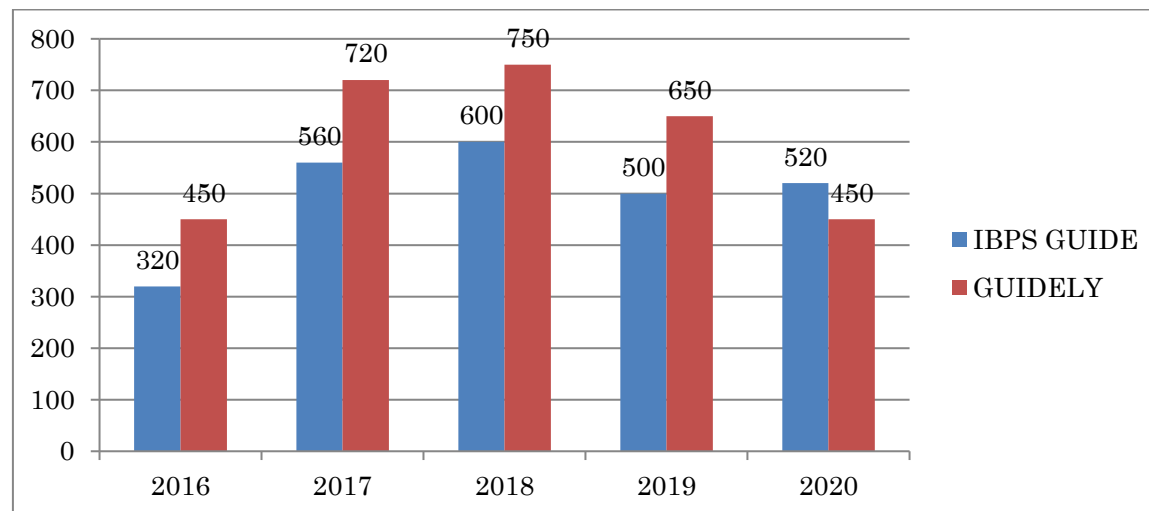
- a) 46%
- b) 48%
- c) 58%

- d) 50%

28. What is the ratio of the total demand of motorcycles of companies Hero and Honda taken together to the Production of motorcycles of company TVS?

- a) 11 : 9
- b) 7 : 5
- c) 5 : 3
- d) 8 : 7

Direction: (29 - 32) The given Bar Graph presents the number of students enrolled for a vocational course in institutes IBPS Guide and Guidely during a period of five years. Institute



29. In which year the number of students enrolled in Guidely is approximately 28% more than the number of students enrolled in IBPS Guide in the same year?

- a) 2017

- b) 2020
- c) 2018
- d) 2019

30. The average number of students (per year) enrolled in Guidely during 2017, 2018 and

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2020 is what percentage more than the number of students enrolled in IBPS Guide during 2019?

- a) 28
- b) 35
- c) 32
- d) 12

31. The total number of students enrolled in IBPS Guide during 2016, 2018 and 2020 is what percentage (correct to one decimal place) of the total number of students enrolled in Guidely during the five years?

- a) 44.4
- b) 47.7
- c) 54.6
- d) 42.8

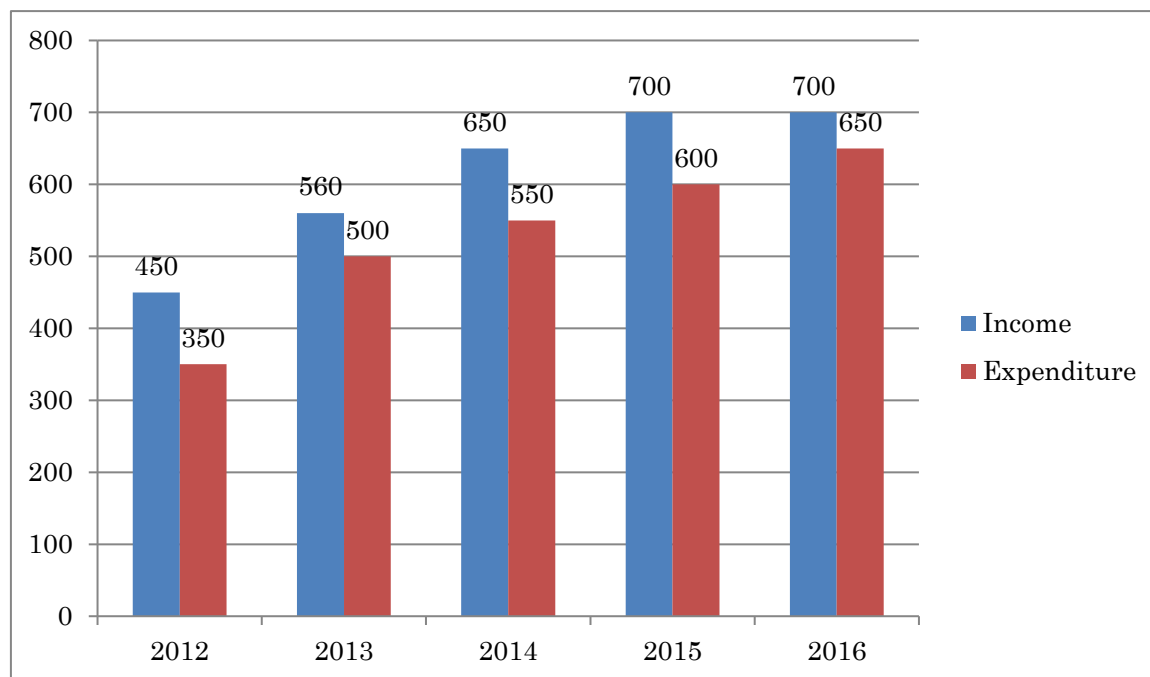
32. What is the ratio of the total numbers of students enrolled in IBPS Guide during 2017 and 2020 to that of students enrolled in Guidely during 2016 and 2018?

- a) 9 : 10
- b) 17 : 18
- c) 21 : 22
- d) 15 : 16

Direction (33 – 36): The given Bar Graph presents Income and Expenditure (in crores of Rupees) of a company for the five years, 2012 to 2016.

Income and Expenditure (in Rs crores) of a company in 5 years-

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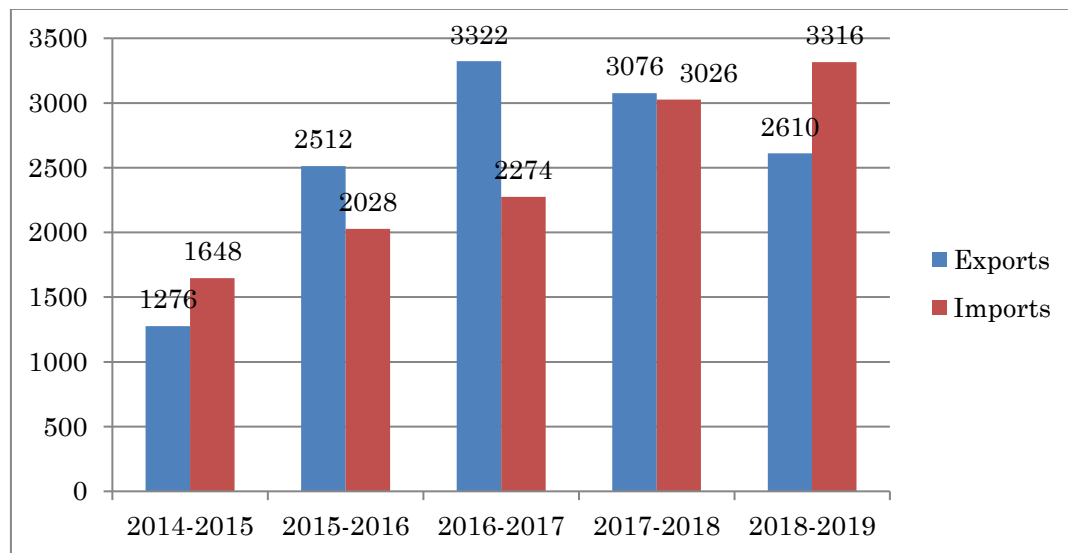


33. The average Income (per year) of the company in five years is what percentage more than its Expenditure in 2013?
- a) 34.2
 - b) 30.8
 - c) 14.6
 - d) 22.4
34. The total Income of the company in 2013, 2015 and 2016 is approximately what percent less than the total Expenditure in the five years?
- a) 26
 - b) 25
 - c) 23
 - d) 22
35. In which year is the Expenditure more than 40% as compared to the Expenditure in the previous year?
- a) 2016
 - b) 2013
 - c) 2018
 - d) 2017
36. What is the ratio of total Expenditure to total Income of the company in 2012, 2014 and 2015?
- a) 11:17
 - b) 13:14
 - c) 9:10

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d) 5:6

Direction: (37 - 40) The given Bar Graph presents the Imports and Exports of an item (in tonnes) manufactured by a company for the five financial years, 2014–2015 to 2018–2019



37. In which financial year the percentage increase in total Exports and Imports is the highest in comparison to its previous financial year?

- a) 2015 – 2016
- b) 2017 – 2018
- c) 2014 – 2015
- d) 2016 – 2017

38. What is the ratio of total Imports to total Exports during 2014-2015, 2016-2017 and 2018-2019?

- a) 3556 : 3023
- b) 3411 : 3141
- c) 3619 : 3604

d) 3175 : 4013

39. What is the average of total Import and Export (in tons) during the five financial year?

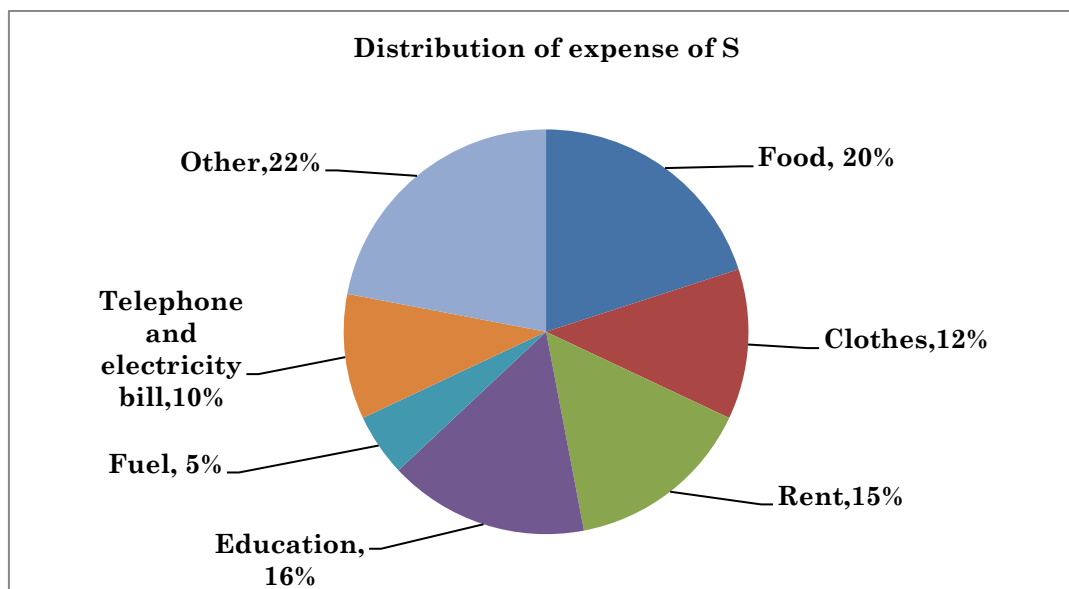
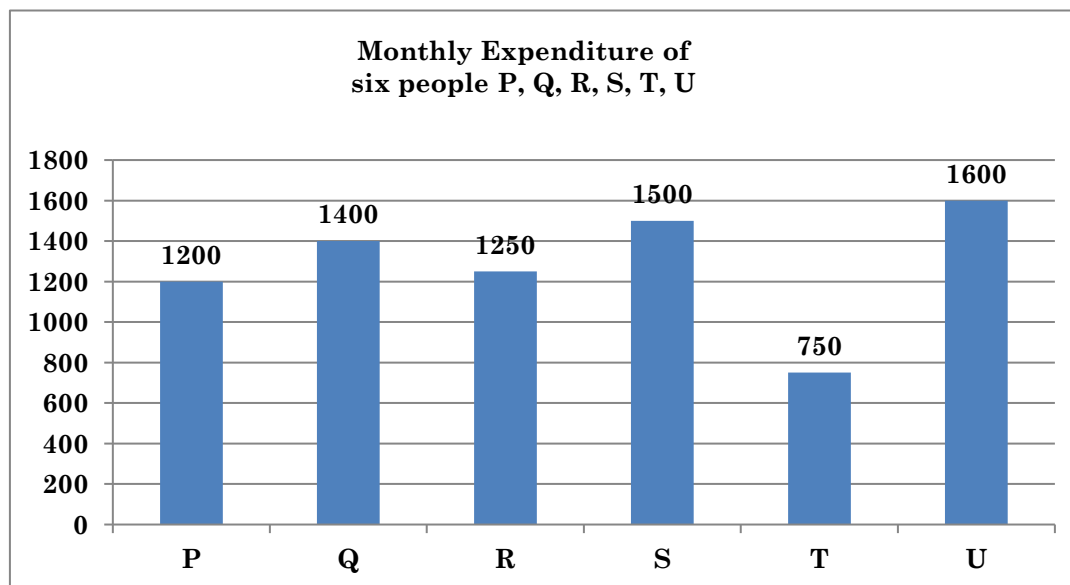
- a) 5279.5
- b) 5017.6
- c) 4552.4
- d) 5325.9

40. In which financial year the total of the Exports and Imports is the lowest?

- a) 2015–2016
- b) 2014–2015
- c) 2016–2017
- d) 2018–2019

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Directions 41- 43: Study the given bar graph and pie chart carefully and answer the questions given below it.



41. If the expenditure of S on food was 20% more than the average expenditure of all the six persons on food, then the average monthly

expenditure on food for all the given persons is.

a) Rs.321

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b) Rs.250

c) Rs.244

d) Rs.300

42. What is the total expenditure of S on rent, education and telephone and electricity bills?

a) Rs.721

b) Rs.456

c) Rs.615

d) Rs.801

43. If Q and U spent respectively 10% and 15% of their expenditure on clothes, then by what percentage was the expenditure of U on clothes more than that of Q?

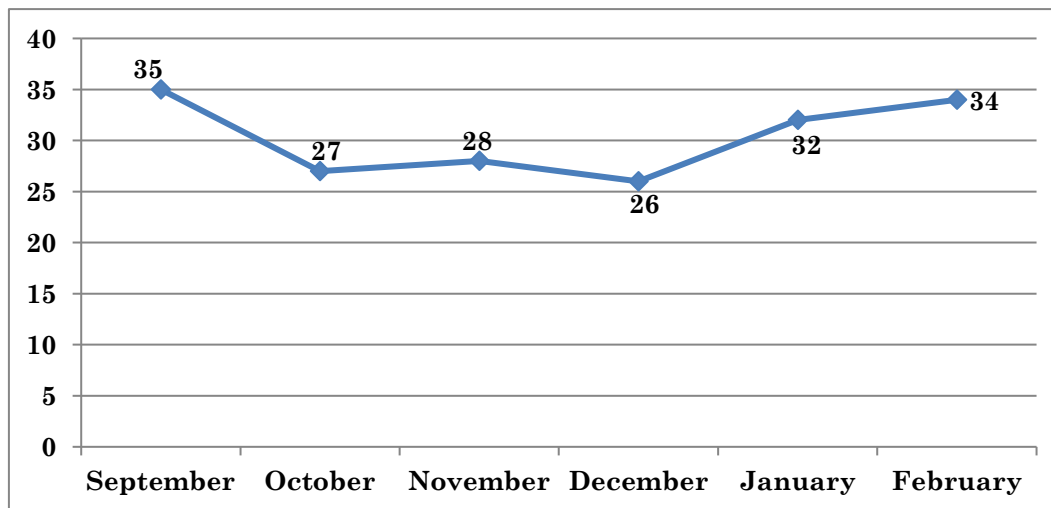
a) 54.25%

b) 60.68%

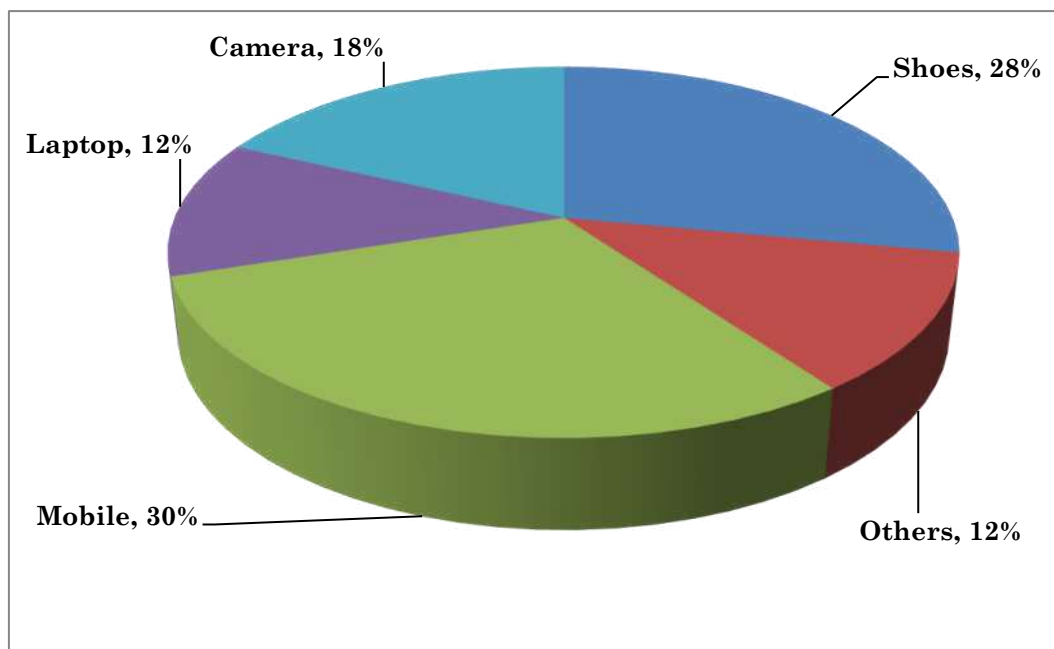
c) 79.52%

d) 71.43%

Directions (44 -47): Study the following graph and answer the following questions: (India's export in \$billions)



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44. The export of Shoes and Laptop together in the month of January is approximately what percent of the exports of Camera and others in the month of September?
- 129%
 - 134%
 - 122%
 - 118%
45. What is the average export of Mobile industry over the period?
- 12.32 billion
 - 9.32 billion
 - 11.84 billion
 - None of these
46. If the export in March is increased by 10% in comparison to previous month, then what is the amount of increase(in billion) in Shoes industry?
- 1.325
 - 0.952
 - 2.426
 - Data insufficient
47. The export of Camera in February is what percent greater than others in September?
- 38.4%
 - 45.7%
 - 37.6%
 - 44.6%

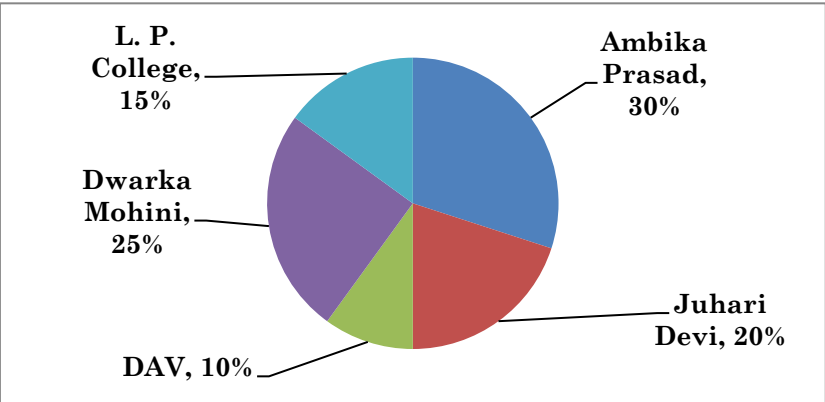
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Directions 48 -50: Study the following table carefully and answer the questions given below it

The following graph shows the number of Boys and Girls (in multiple of 100) in Class VI to Class X.



The following graph shows the percentage share of five schools in the total students studying in that class.



Note:

Total students = Boys + Girls

48. If the number of boys studying in School DwarkaMohini is thrice the number of girls studying in School DwarkaMohini, what is the total number of boys studying in School DwarkaMohini?

a) 36,111

b) 52,500

c) 48,745

d) 55,321

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49. The total number of girls studying in Class VII in School Juhari Devi is 11000. What is its approximate percentage share in the number of boys studying in Class VII.

- a) 13%
- b) 11%
- c) 17%
- d) 14%

50. What is the ratio of number of boys in School Ambika Prasad to the number of girls in School Dwarka Mohini?

- a) 13 : 15
- b) 17 : 23
- c) 20 : 26
- d) can't be determined

Data Interpretation – Answer and Explanation

50) Answer: B

⇒ Total cultivation area = 3000 acres

⇒ Cultivation area for Tomato = 17% of total cultivation area

= 17% of 3000

⇒ Cultivation area for Tomato = 510 Acre

50) Answer: A

⇒ Total cultivation area = 3000 acres

⇒ Cultivation area for Potato = 40% of total cultivation area

⇒ Cultivation area for Brinjal = 15% of total cultivation area

⇒ Cultivation area for Potato and Brinjal = (40 + 15)% of total cultivation area

⇒ Cultivation area for Potato and Brinjal = 55% of 3000

∴ Cultivation area for Potato and Brinjal = 1650 Acre

50) Answer: D

⇒ Total cultivation area = 3000 acres

⇒ Cultivation area for Radish = 5% of total cultivation area

⇒ Cultivation area for Tomato = 17% of total cultivation area

⇒ Cultivation area for Cabbage = 10% of total cultivation area

⇒ Cultivation area for Radish, Tomato and Cabbage = (5 + 17 + 10) % of total cultivation area

⇒ Cultivation area for Radish, Tomato and Cabbage = 32% of 3000

∴ Cultivation area for Radish, Tomato and Cabbage = 960 Acre

4) Answer: C

⇒ Total cultivation area = 3000 acres

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⇒ Cultivation area for Carrot = 10% of total cultivation area

⇒ Cultivation area for Tomato = 17% of total cultivation area

⇒ Cultivation area for Carrot and Tomato = $(10 + 17)$ % of total cultivation area

⇒ Cultivation area for Carrot and Tomato = 27% of 3000

∴ Cultivation area for Carrot and Tomato = 810 Acre

5) Answer: C

Total funds collected = Rs. 200 crore

∴ Fund collected through Ebooks = Rs. $(200 \times 2/100)$ crore = Rs. 4 crore

∴ Funds collected through Adsense = Rs. $(200 \times 10/100)$ = Rs. 20 crore

∴ the amount of fund collected through Ebooks and Adsense together,

⇒ Rs. $(4 + 20)$ crore

⇒ Rs. 24 crore

6) Answer: A

Total amount collected = Rs. 200 crore

∴ Amount collected from Pendrive Course = $200 \times 18/100$ = Rs. 36 crore

7) Answer: D

Total amount collected = Rs. 200 crore

∴ Amount collected from Online exams = $200 \times 40/100$ = Rs. 80 crore

∴ Amount collected from Online classes = $200 \times 30/100$ = Rs. 60 crore

∴ Required difference = Rs. $(80 - 60)$ crore = Rs. 20 crore

8) Answer: B

Total funds collected = Rs. 200 crore

∴ Funds collected through Adsense = Rs. $(200 \times 10/100)$ = Rs. 20 crore

∴ total amount invested in research development facilities = $20 \times 1/5$ = Rs. 4 crore

9) Answer: B

As shown in the pie chart, the value of Promotion is 450 lakhs which is greater than any other expenditure.

So answer = Promotion

10) Answer: A

Total Expenditure = Expenditure of (Teacher + Typist + Promotion + Rent + Content development + Software development + Taxes)

∴ Total Expenditure = $300 + 150 + 450 + 250 + 200 + 300 + 150 = 1800$

11) Answer: D

∴ The central angle of the sector representing Teacher = $300/1800 \times 360^\circ = 60^\circ$

12) Answer: D

Total expenditure on Content development and Software development = $200 + 300 = 500$

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\therefore Required Percentage = $500/1800 \times 100 = 500/18 = 27.77\%$

13) Answer: D

According to the graph, the highest number of people (500) says that their favourite travel destination is Rajgir.

14) Answer: C

Number of people whose favourite travel destination is

Rajgir = 500

Delhi = 400

Agra = 150

Jharkhand = 350

Mumbai = 350

Patna = 50

Kanpur = 450

\therefore Total number of people who responded to the survey = 2250

15) Answer: D

Total number of people who responded to the survey = 2250

Number of people whose favourite travel destination is

Patna = 50

\therefore Measure of central angle = $(50/2250) \times 360^\circ = 8^\circ$

16) Answer: D

Total number of people who responded to the survey = 2250

Number of people whose favourite travel destination is Rajgir = 500

Number of people whose favourite travel destination is Delhi = 400

Number of people whose favourite travel destination is Rajgir + Delhi = $500 + 400 = 900$

\therefore Required percentage = $(900/2250) \times 100 = 40\%$

17) Answer: B

According to the survey, author Kabirdas(500) is the favorite of most people.

18) Answer: D

Total respondents = 2250

Respondents who say their favourite author is Jayshankarprasad = 300

& respondents who say their favourite author is Kabirdas = 500

(Jayshankarprasad + Kabirdas) = 800

\therefore Required Percentage = $800/2250 \times 100 = 35.55\%$

19) Answer: B

2250 people represent = 360°

\Rightarrow 1 people represent = $360^\circ/2250$

\therefore 400 people represent = $400/2250 \times 360^\circ = 64^\circ$

20) Answer: A

\therefore Total number of people who have responded to the survey = Jayshankarprasad + Kabirdas + Mahadeviverma + Raskhan + Sumitranandan pant + Surdas + Tulsidas = 2250

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21) Answer: C

Go through options

In 2017,

$$\text{Required percentage} = (650 - 500)/500 \times 100 = 30\%$$

22) Answer: B

Total number of history students in 2016, 2018 and 2020 = $550 + 700 + 650 = 1900$

Total number of commerce students in five years = $450 + 500 + 600 + 560 + 750 = 2860$

$$\begin{aligned}\text{Required percentage} &= (2860 - 1900)/2860 \times 100 \\ &= 960/2860 \times 100 \\ &= 33.6\%\end{aligned}$$

23) Answer: C

The average number of commerce students in 2016, 2018 and 2020 = $(450 + 600 + 750)/3 = 600$

Number of history students in 2016 = 550

$$\begin{aligned}\text{Required percentage} &= (600 - 550)/550 \times 100 \\ &= 50/550 \times 100 = 9\frac{1}{11}\%\end{aligned}$$

24) Answer: C

Total number of students of commerce in 2016 and 2020 = $450 + 750 = 1200$

Total number of students of history in 2017 and 2020 = $650 + 650 = 1300$

$$\text{Required ratio} = 1200 : 1300 = 12 : 13$$

25) Answer: A

Average production of motorcycle of companies Bajaj, TVS and Suzuki = $(90 + 135 + 120) / 3 = 115$ lakhs

Demand of company Honda = 125 lakhs

$$\begin{aligned}\text{Required percentage} \\ &= (125 - 115)/115 \times 100 \\ &= 10/115 \times 100 = 8\%\end{aligned}$$

26) Answer: B

For company TVS,

$$\begin{aligned}\text{Required percentage} \\ &= (135 - 110)/110 \times 100 \\ &= 22.7\% = 23\% \text{ (178 approx.)}\end{aligned}$$

27) Answer: A

The total production of motorcycles of companies Bajaj and Honda = $90 + 140 = 230$ lakhs

Demand of all companies taken together = $100 + 70 + 110 + 125 + 95 = 500$ lakhs

$$\begin{aligned}\text{Required percentage} &= 230/500 \times 100 \\ &= 46\%\end{aligned}$$

28) Answer: C

Total demand of motorcycles of companies Hero and Honda = $100 + 125 = 225$ lakhs

The production of motorcycles of company TVS = 135 lakhs

$$\text{Required Ratio} = 225 : 135 = 5 : 3$$

29) Answer: A

In year 2017

$$\begin{aligned}\text{Required percentage} \\ &= (720 - 560)/560 \times 100 \\ &= 160/560 \times 100 = 28.5\%\end{aligned}$$

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30) Answer: A

Total average number of students enrolled in Guidely during 2017, 2018, and 2020

$$= (720+750+450)/3 = 640$$

The number of students enrolled in IBPS Guide during 2019 = 500

$$\text{Required percentage} = (640 - 500)/500 \times 100 = 28\%$$

31) Answer: B

Total number of students enrolled in IBPS Giude during 2016, 2018, and 2020 = $320 + 600 + 520 = 1440$

Total number of students enrolled in guidely during the five years = $450 + 720 + 750 + 650 + 450 = 3020$

$$\text{Required percentage} = 1440 / 3020 \times 100 = 47.7\%$$

32) Answer: A

Total number of students enrolled in IBPS Guide during 2017 and 2020 = $560 + 520 = 1080$

Total number of students enrolled in guidely during 2016 and 2018 = $450 + 750 = 1200$

$$\text{Required Ratio} = 1080 : 1200 = 9 : 10$$

33) Answer: D

Average Income of the company in five year = $(450+560+650+700+700)/5$

$$= 3060/5 = 612$$

Required percentage

$$= (612-500)/500 \times 100$$

$$= 22.4\%$$

34) Answer: A

Total income of the company in 2013, 2015 and 2016 = $560 + 700 + 700 = 1960$

Total expenditure in the five year = $350 + 500 + 550 + 600 + 650 = 2650$

$$\text{Required percentage} = (2650-1960)/2650 \times 100 = 26\%$$

35) Answer: B

In 2013,

$$= (500-350)/350 \times 100 = 42.8\%$$

36) Answer: D

Total expenditure in 2012, 2014 and 2015 = $350 + 550 + 600 = 1500$

Total income in 2012, 2014 and 2015 = $450 + 650 + 700 = 1800$

$$\text{Required ratio} = 1500 : 1800 = 5 : 6$$

37) Answer: A

From the bar graph, total exports and import's growth is highest in 2015-2016

Total exports and imports in year 2015-2016 = 4540

Total exports and imports in year 2014-2015 = 2904

$$\text{Percentage increase} = \frac{1636}{2904} \times 100 = 56\%$$

38) Answer: C

Total imports in 2014-15, 2016-17 and 2018-19 = $1648 + 2274 + 3316 = 7238$

Total exports in 2014-15, 2016-17 and 2018-19 = $1276 + 3322 + 2610 = 7208$

$$\text{Required ratio} = 7238 : 7208 = 3619 : 3604$$

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39) Answer: B

Total import and export during the five financial years

$$= 1276 + 1648 + 2512 + 2028 + 3322 + 2274 + 3076 + 3026 + 2610 + 3316 = 25088$$

$$\text{Average} = \frac{25088}{5} = 5017.6$$

40) Answer: B

From the given bar graph in 2014-15 year total exports and imports is lowest

41) Answer: b

Total expenditure of S = 1500

Expense of S on food = 20% of 1500 = 300

Given,

Let the average expenditure of all six people on food be x .

Given,

$$300 = x \left(1 + \frac{20}{100} \right) \\ \Rightarrow x = 250$$

42) Answer: c

Total expenditure of S = Rs. 1500

Expenditure on rent, education and telephone and electricity bills

$$= (15 + 16 + 10)\% \text{ of } 1500 = 41\% \text{ of } 1500 = 615$$

43) Answer: d

Total expenditure of Q = 1400

Expenditure on clothes = 10% of 1400 = 140

Total expenditure of U = 1600

Expenditure on clothes = 15% of 1600 = 240

% by which expenditure of U on clothes is greater than that of Q = $\frac{240-140}{140} \times 100 = 71.43\%$

44) Answer: c

Export of Shoes and Laptop together in January = $(28 + 12)\%$ of 32 = $40/100 \times 32 = 12.8$ billion

Exports of Camera and others in the month of September = $(18 + 12)\%$ of 35 = $30/100 \times 35 = 10.5$ billion

Required percentage = $(12.8/10.5) \times 100 = 122\%$ (180pprox.)

45) Answer: d

Total exports = $35 + 27 + 28 + 26 + 32 + 34 = 182$ billion

Exports from Mobile industry = 30 % of 182 = 54.6 billion

54.6 billion is divided amongst 6 months

Hence average export from Mobile industry = $54.6/6 = 9.1$ billion

46) Answer: b

Export in February = 34 Billion

\therefore Export in March = $34 \times 1.1 = 37.4$ Billion

\Rightarrow Increase in export of Shoes = $(37.4-34) \times (28/100) = 0.952$ Billion

47) Answer: b

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$$\text{Export of Camera in February} = \frac{18}{100} \times 34 = 6.12$$

$$\text{Export of others in September} = \frac{12}{100} \times 35 = 4.2$$

$$\text{Required percentage} = \frac{6.12 - 4.2}{4.2} \times 100 = 45.7\%$$

48) Answer: b

Total number of students studying

$$\Rightarrow 70000 + 68000 + 52000 + 46000 + 44000 = 2,80,000$$

Total number of students in School DwarkaMohini from Class VI to Class X = 25% of 2,80,000 = 70000.

Let number of girls in School DwarkaMohini = 'x'

\Rightarrow Number of boys in School DwarkaMohini = '3x'

Thus, total number of students in School DwarkaMohini = '4x'.

$$\Rightarrow 4x = 70000$$

$$\Rightarrow x = 17500$$

$$\therefore \text{Number of boys studying in School DwarkaMohini} = 3 \times 17500 = 52,500.$$

49) Answer: b

Total number of students studying in Class VII = 68000

Total number of students studying in Class VII in School Juhari Devi = 20% of 68000 = 13600

Total number of girls studying in Class VII in School Juhari Devi = 11000.

Thus,

Total number of boys studying in Class VII in School Juhari Devi = 13600 – 11000 = 2600

Total number of boys studying in Class VII = 24000

Thus, the required percentage = $(2600/24000) \times 100 = 10.83\% \approx 11\%$

50) Answer: d

The number of boys and girls cannot be known, so the ratio cannot be known.

LCM and HCF

1) The LCM of two numbers is 432 and their HCF is 72. if one of the number is 144, the other number is:

- a) 216
- b) 144
- c) 92
- d) 152

2) The HCF of 6453 and 7409 is 239, Their LCM is:

- a) 682
- b) 1047
- c) 200043
- d) 956

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3) The HCF and LCM of two numbers are 6 and 462 respectively. The numbers of such pairs will be

- a) 0
- b) 1
- c) 2
- d) 3

4) The HCF and the product of two numbers are 30 and 12600 respectively. The number of possible pairs are/is

- a) 0
- b) 1
- c) 2
- d) 3

5) The LCM of two numbers is 375 and their HCF is 10. If one of the number is 15, the other number is

- a) 300
- b) 150
- c) 125
- d) 250

6) The HCF and product of two numbers are $15/2$ and 3150 respectively. The numbers of such pairs will be

- a) 0

b) 1

c) 2

d) 3

7) The LCM of two numbers is 4 times of their HCF. The sum of LCM and HCF is 250. If one of the number is 200 then the other number is

- a) 50
- b) 150
- c) 200
- d) 350

8) The LCM of two numbers is 3640 and their HCF is 78. If one of the number is 156, the other number is

- a) 1500
- b) 1820
- c) 2000
- d) 2080

9) The LCM of two numbers is 20 times of their HCF. The sum of LCM and HCF is 525. If one of the number is 100 then the other number is?

- a) 355
- b) 150
- c) 225
- d) 125

10) The HCF and product of two numbers are 24 and 13824 respectively. The number of possible pairs of the numbers are/is

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- a) 0
- b) 1
- c) 2
- d) 3

11) Product of two co prime numbers is 117. Then their LCM is?

- a) 9
- b) 13
- c) 117
- d) 39

12) If the product of two numbers is 2560 and their HCF is 16. The LCM of the numbers will be

- a) 90
- b) 160
- c) 178
- d) 82

13) The LCM of two numbers is 7 times of their HCF. The sum of LCM and HCF is 560. If one of the number is 200 then the other number is?

- a) $343/2$
- b) $161/3$
- c) 178
- d) 82

14) The HCF of two numbers is 9. Which of the following can never be their LCM?

- a) 27

- b) 81
- c) 82
- d) 117

15) Find the HCF of 186 and 147

- a) 2
- b) 6
- c) 3
- d) 7

16) Find the HCF of 798 and 582?

- a) 4
- b) 3
- c) 12
- d) 6

17) Find the LCM of 40, 50, 60, 80?

- a) 1400
- b) 1200
- c) 1250
- d) 1000

18) Find the LCM of 220, 310

- a) 4590
- b) 5480
- c) 7840
- d) 6820

19) Find the LCM of 110, 220, 330

- a) 660
- b) 560
- c) 440

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d) 880

20) Find LCM of 80, 60, 40, 50

a) 1200

b) 1260

c) 860

d) 1060

21) The HCF and LCM of two 2-digit numbers are 8 and 240 respectively. The numbers are

a) (40, 48)

b) (40, 96)

c) (16, 40)

d) None of the above

22) The HCF and LCM of two 2-digit numbers are 4 and 120 respectively. The numbers are?

a) (20, 24)

b) (40, 96)

c) (16, 40)

d) None of the above

23) Find the HCF of 1585 and 2025?

a) 40

b) 25

c) 15

d) 5

24) Find the LCM of 80, 120, 60?

a) 140

b) 240

c) 125

d) 100

25) The HCF and LCM of two 2-digit numbers are 5 and 200 respectively. The numbers are?

a) (25, 40)

b) (40, 96)

c) (16, 40)

d) None of the above

26) What is the smallest number which leaves remainder 3 in each case when the number is divided by 10, 12, and 16 but leaves no remainder when it is divided by 9?

a) 243

b) 343

c) 293

d) 178

27) What is the smallest number which leaves remainder 3 in each case when divided by any of the numbers 15, 18, 24 but leaves no remainder when it is divided by 3?

a) 363

b) 343

c) 193

d) 178

28) Find the HCF of 245, 750 and 440

a) 10

b) 5

c) 15

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d) 25

29) The ratio of two numbers is 8:10 and their LCM is 240. the numbers are

a) 24, 30

b) 52, 25

c) 15, 40

d) 25, 60

30) The ratio of two numbers is 4:6 and their LCM is 72. the numbers are

a) 10, 20

b) 12, 18

c) 15, 20

d) 25, 40

31) Let N be the greatest number that will divide 66, 88, 110 leaving the same remainder in each case. then sum of the digits in N is

a) 5

b) 4

c) 6

d) 3

32) Find the HCF of 245, 750 and 440?

a) 25

b) 10

c) 12

d) 5

33) The HCF and LCM of two 2-digit numbers are 8 and 400 respectively. The numbers are?

a) (25, 40)

b) (40, 96)

c) (16, 40)

d) None of the above

34) The greatest number which divides 123 and 244 leaving remainder 3 and 4 respectively is?

a) 250

b) 105

c) 124

d) 120

35) The least number which is a perfect square and is divisible by each of the numbers 16, 20 and 24 is?

a) 1500

b) 13824

c) 2500

d) 3600

36) The smallest number which when divided by 24 and 32 leaves remainder 10 and 18 respectively is

a) 84

b) 110

c) 96

d) 82

37) The sum of two numbers is 95 their difference is 95/5. Find their LCM:

a) 117

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- b) 247
- c) 114
- d) 2166

38) Find the HCF of 220, 310, 420 and 280?

- a) 4
- b) 3
- c) 12
- d) 10

39) The product of two numbers is 13824, if the HCF is 24 find their LCM

- a) 46
- b) 576
- c) 662
- d) 616

40) Find the LCM of 220 and 310

- a) 6820
- b) 7240
- c) 7720
- d) 6500

41) The sum of two numbers is 108 their difference is 108/18. Find their LCM

- a) 3117
- b) 2747
- c) 301
- d) 969

42) The smallest perfect square that is divisible by each of 6, 12 and 18 is

- a) 49
- b) 24
- c) 12
- d) 36

43) HCF of $\frac{2}{3}$, $\frac{4}{5}$ and $\frac{6}{7}$ is?

- a) $\frac{48}{105}$
- b) $\frac{2}{105}$
- c) $\frac{1}{105}$
- d) $\frac{24}{105}$

44) Find the greatest number which will exactly divide 400 and 420?

- a) 15
- b) 24
- c) 12
- d) 20

45) What is the greatest number which will divide 110 and 128 leaving a remainder 2 in each case?

- a) 15
- b) 18
- c) 12
- d) 5

46) The LCM and the HCF of the numbers 14 and 28 are in the ratio of:

- a) 2 : 3
- b) 2 : 1
- c) 3 : 1
- d) 2 : 5

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47) Find the LCM of 20, 25, 35, 40

- a) 1400
- b) 1200
- c) 1250
- d) 1000

48) When a number is divided by 15, 20 and 35 each time the remainder is 8. Then the smallest possible number is:

- a) 428

b) 538

- c) 418
- d) 630

49) Two numbers are in the ratio of 2 : 3. If their LCM is 120. The smaller of the two number is:

- a) 40
- b) 60
- c) 20
- d) 80

LCM and HCF – Answer and Explanation

1) **Answer: A**

Solution

$$\text{LCM} \times \text{HCF} = a \times b$$

a = First number

b = Second number

$$72 \times 432 = 144 \times b$$

$$b = 216$$

2) **Answer: C**

Solution

$$\text{LCM} \times \text{HCF} = a \times b$$

a = First number

b = Second number

$$\text{LCM} \times 239 = 6453 \times 7409$$

$$\text{LCM} = 200043$$

3) **Answer: C**

Solution

Let the numbers be $6x$ and $6y$

x and y are co prime to each other,

$$\text{LCM} = 6xy$$

$$6xy = 462$$

$$xy = 77$$

Possible pairs = (1, 77) and (7, 11)

4) **Answer: C**

Solution

Let the numbers be $30x$ and $30y$

$$30x \times 30y = 12600$$

$$xy = 14$$

Possible pairs = (1, 14) and (2, 7)

5) **Answer: D**

Solution

$$\text{LCM} \times \text{HCF} = a \times b$$

a = First number

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b = Second number

$$375 \times 10 = 15 \times b$$

$$b = 250$$

6) Answer: C

Solution

Let the numbers be $(15/2)x$ and $(15/2)y$

x and y co prime numbers

$$(15/2)x \times (15/2)y = 3150$$

$$xy = 56$$

Possible pairs = (1, 56) and (7, 8)

7) Answer: A

Solution

$$\text{LCM} = 4 \text{ HCF}$$

$$\text{HCF} + 4\text{HCF} = 250$$

$$5\text{HCF} = 250$$

$$\text{HCF} = 50$$

$$\text{LCM} = 4 \times 50 = 200$$

$$\text{Second number} = (\text{LCM} \times \text{HCF}) / \text{First number}$$

$$= (200 \times 50) / 200$$

$$= 50$$

8) Answer: B

Solution

$$\text{LCM} \times \text{HCF} = a \times b$$

a = First number

b = Second number

$$3640 \times 78 = 156 \times b$$

$$b = 1820$$

9) Answer: D

Solution

$$\text{LCM} = 20 \text{ HCF}$$

$$\text{HCF} + 20\text{HCF} = 525$$

$$21\text{HCF} = 525$$

$$\text{HCF} = 25$$

$$\text{LCM} = 20 \times 25 = 500$$

$$\text{Second number} = (\text{LCM} \times \text{HCF}) / \text{First number}$$

$$= (500 \times 25) / 100$$

$$= 125$$

10) Answer: C

Solution

$$\text{HCF} = 24$$

Numbers will be $24x$ and $24y$

Where x and y are prime to each other

$$24x \times 24y = 13824$$

$$xy = 24$$

Possible pairs = (1, 24) and (3, 8)

11) Answer: C

Solution

HCF of two co prime numbers = 1

Product of numbers = their LCM = 117

12) Answer: B

Solution

$$\text{LCM} \times \text{HCF} = a \times b$$

a = First number

b = Second number

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$$\text{LCM} \times 16 = 2560$$

$$\text{LCM} = 160$$

13) Answer: A

Solution

$$\text{LCM} = 7 \text{ HCF}$$

$$\text{HCF} + 7\text{HCF} = 560$$

$$8\text{HCF} = 560$$

$$\text{HCF} = 70$$

$$\text{LCM} = 7 \times 70 = 490$$

$$\text{Second number} = (\text{LCM} \times \text{HCF}) / \text{First number}$$

$$= (490 \times 70) / 200$$

$$= 343/2$$

14) Answer: C

Solution

HCF of two numbers is 9. This means 9 is a factor common to both numbers. LCM is common multiple for the two numbers.

Hence option c is correct.

15) Answer: C

Solution

Consider a greatest number which can divide both numbers, will be their HCF.

Here HCF will be 3.

16) Answer: D

Solution

Consider a greatest number which can divide both numbers, will be their HCF.

Here HCF will be 6.

17) Answer: B

Solution

Find out a least number which could be completely divided by 40, 50, 60, 80

Here that number will be 1200.

Hint: Make factor of numbers.

18) Answer: D

Solution

Find out a least number which could be completely divided by 220, 310.

Here that number will be 6820.

Hint: Make factor of numbers.

19) Answer: A

Solution

Find out a least number which could be completely divided by 110, 220 and 330.

Here that number will be 660.

Hint: Make factor of numbers.

20) Answer: A

Solution

Find out a number which could be completely divided by 80, 40, 60, 50

Here that number will be 1200.

Hint: Make factor of numbers.

21) Answer: A

Solution

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Let numbers are $8x$ and $8y$.

$$8xy = 240$$

$$xy = 30$$

Possible pairs = (1, 30), (2, 15), (5, 6)

Possible numbers = (8, 240), (16, 120), (40, 48)

Answer = (40, 48)

22) Answer: A

Solution

Let numbers are $4x$ and $4y$.

$$4xy = 120$$

$$xy = 30$$

Possible pairs = (1, 30), (2, 15), (5, 6)

Possible numbers = (4, 120), (8, 60), (20, 24)

Answer = (20, 24)

23) Answer: D

Solution

Consider a greatest number which can divide both numbers, will be their HCF.

Here HCF will be 5.

24) Answer: B

Solution

Find out a number which could be completely divided by 80, 120, 60

Here that number will be 240.

Hint: Make factor of numbers.

25) Answer: A

Solution

Let numbers are $5x$ and $5y$.

$$5xy = 200$$

$$xy = 40$$

Possible pairs = (1, 40), (5, 8)

Possible numbers = (5, 200), (25, 40)

Answer = (25, 40)

26) Answer: A

Solution

Required number gives remainder 3 when divided by (10, 12, 16) and zero remainder when divided by 9.

LCM of (10, 12, 16) = 240

$(240k+3)/9$ at $k=1$

Remainder = 0

Hence answer = 243

27) Answer: A

Solution

Required number gives remainder 3 when divided by (15, 18, 24) and zero remainder when divided by 3.

LCM of (15, 18, 24) = 360

$(360k+3)/3$ at $k=1$

Remainder = 0

Hence answer = 363

28) Answer: B

Solution

Consider a greatest number which can divide both numbers, will be their HCF.

Here HCF will be 5.

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29) Answer: A

Solution

Let numbers are A & B

A:B

8x:10x

$$\text{LCM} = 8 \cdot 10 \cdot x = 80x$$

$$80x = 240$$

$$x = 3$$

$$A = 24$$

$$B = 30$$

30) Answer: B

Solution

Let numbers are A & B

A:B

4x:6x

$$\text{LCM} = 4 \cdot 6 \cdot x = 24x$$

$$24x = 72$$

$$x = 3$$

$$A = 12$$

$$B = 18$$

31) Answer: B

Solution

66, 88, 110 are three numbers.

To find the greatest number which leaves common remainder in each case.

$$\text{The HCF of } (88-66), (110-88), (110-66) = 22$$

In this case the number will be 22

And sum of digits will be = 4

32) Answer: D

Solution

Consider a greatest number which can divide both numbers, will be their HCF.

Here HCF will be 5.

33) Answer: D

Solution

Let numbers are 8x and 8y.

$$8xy = 400$$

$$xy = 50$$

Possible pairs = (1, 50), (2, 25)

Possible numbers = (8, 400), (16, 200)

No any two digit number possible.

34) Answer: D

Solution

Subtract the remainders from the actual numbers respectively

Then find the HCF.

$$\text{the HCF of } (123-3), (244-4) = 120$$

The number will be 120

35) Answer: D

Solution

$$\text{LCM of } (16, 20, 24) = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \cdot 3$$

To make perfect square multiply by $5 \cdot 3$

$$\text{Hence answer is } 4 \cdot 4 \cdot 15 \cdot 15 = 3600$$

36) Answer: D

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Solution

the number = $\text{LCM}(24, 32) - k$, where $k = 24 - 10 = 32 - 18 = 14$

$\text{LCM of } 24 \text{ and } 32 = 96$

Subtract the common difference from 96, Required number will be $(96 - 14) = 82$

37) Answer: C

Solution

$$A + B = 95$$

$$A - B = 95/5$$

$$A + B = 95$$

$$A - B = 19$$

$$A = 57$$

$$B = 38$$

$$\text{LCM of } (57, 38) = 114$$

38) Answer: D

Solution

Consider a greatest number which can divide both numbers, will be their HCF.

Hint: take difference of numbers.

Here HCF will be 10.

39) Answer: B

Solution

$$\text{Product of numbers} = 13824$$

$$\text{HCF} = 24$$

$$\text{LCM} = 13824/24$$

$$= 576$$

40) Answer: A

Solution

Find out a number which could be completely divided by 220 and 310.

Here that number will be 6820.

Hint: Make factor of numbers.

41) Answer: D

Solution

$$A + B = 108$$

$$A - B = 108/18$$

$$A + B = 108$$

$$A - B = 6$$

$$A = 57$$

$$B = 51$$

$$\text{LCM of } (57, 51) = 969$$

42) Answer: D

Solution

$$\text{LCM of } (6, 12, 18)$$

$$= 36$$

Hint: To find perfect square split the LCM into factors so that it becomes the square.

Here answer will be 36.

43) Answer: B

Solution

$\text{HCF of fractional numbers} = (\text{HCF of numerator} / \text{LCM of denominator})$

$$(\text{HCF } 2, 4, 6) / (\text{LCM } 3, 5, 7)$$

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$$= 2/105$$

44) Answer: D

Solution

Here the greatest number is HCF of 400 and 420.

Hint: Take the difference of numbers

HCF will be 20

45) Answer: B

Solution

Hint: Subtract the common difference from both the numbers. here is this case common difference is 2

And you will get 108 and 126 respectively

HCF of 108 and 126 = 18

46) Answer: B

Solution

Numbers, $x = 14$ and $y = 28$

HCF of (14, 28)

HCF = 14

Now,

LCM of (14, 28)

$$14 \times 1 \times 2 = 28$$

$$\text{LCM} : \text{HCF} = 28 : 14$$

$$= 2 : 1$$

47) Answer: A

Solution

Find out a number which could be completely divided by 20, 25, 35, 40

Here that number will be 1400.

Hint: Make factor of numbers.

48) Answer: A

Solution

LCM of (15, 20, 35)

$$= 5 \times 3 \times 4 \times 7 = 420$$

$$\text{Required number} = 420 + 8 = 428$$

49) Answer: A

Solution

Let the numbers are x and y respectively.

$$x : y = 2 : 3$$

Let $2m : 3m$

$$\text{LCM} = 2 \times 3 \times m = 120$$

$$m = 20$$

$$\text{Numbers are } 20 \times 2 = 40 \text{ and } 20 \times 3 = 60$$

$$\text{Smaller number} = 40$$

Elementary Statistics

1) Which of the following relation is true?

a) $\text{Mode} = \text{Median} - \text{Mean}$

b) $\text{Mode} = 3\text{Median} + 2\text{Mean}$

c) $\text{Mode} = 3\text{Median} - \text{Mean}$

d) $\text{Mode} = 3\text{Median} - 2\text{Mean}$

2) Find the mean of the prime numbers between 9 and 50?

a) 60

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b) 30

c) 15

d) None of these

3) Find the arithmetic mean of the series starting from 1 and ending at 34 ?

a) 17.5

b) 12.5

c) 16.5

d) None of these

4) Find the mode of $4x$, $16x^3$, $8x^2$, $2x$ and x ?

a) x

b) 1

c) no mode

d) $4x$

5) Find the median of 2, 10, 15, 11, 5, 8 ?

a) 9

b) 8

c) 10

d) 1

6) Find the mode of 2, 12, 15, 2, 14, 2, 10, 2 ?

a) 10

b) 12

c) 2

d) None of these

7) Find the mode of 1, 2, 3, 5, 4, 8, 7, 5, 1, 2, 5, 9, 15 ?

a) 1

b) 5

c) 3

d) 15

8) What is the arithmetic mean of 2, 4, 6, 8, 24, 30 ?

a) 55

b) 45

c) 30

d) 16

9) What is the arithmetic mean of 1, 2, 3, 4, 199, 200 ?

a) 100

b) 100.5

c) 102.5

d) 101.5

10) Find the arithmetic mean of the following:

$x - 1$, $x + 1$, $x - 2$, $x + 2$, x

(a) $2x$

(b) x

(c) $3x$

(d) $5x$

11) Find the arithmetic mean of the following:

$x + 10$, $x + 1$, $x - 20$, $x + 12$, $2 - 4x$

(a) x

(b) 5

(c) 2

(d) 1

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12) If the heights of five persons are 125 cm, 156 cm , 175 cm , 180 cm and 175 cm then find the arithmetic mean of their heights ?

- a) 160.5
- b) 162.2
- c) 171.5
- d) 180.5

13) Find the mean of first five positive numbers which are divisible by 2 and 3 both?

- a) 9
- b) 21
- c) 15
- d) 18

14) The value of mode is 10 and median is 5. Find the value of mean?

- a) 2.5
- b) 5
- c) 7.5
- d) 1

15) What is the range of marks scored by five students in Reasoning which are as follows –

65 , 75 , 82 , 92 and 80

- a) 20
- b) 25
- c) 27
- d) 30

16) What is the range of heights of ten persons in a family which are as follows –

165 , 175 , 182 , 192 , 180 , 170 , 180 , 185 , 145 and 150 cm

- a) 42
- b) 40
- c) 47
- d) 45

17) Find the mean of the smallest triplet of right angle triangle ?

- a) 4
- b) 5
- c) 3
- d) 12

18) Find the median of 5.25, 2.50, 1.50, 4.50 and 5?

- a) 5.25
- b) 4.50
- c) 5.0
- d) None of these

19) Find the median of the following :-

$x - 1$, $x + 2$, $x - 10$, $x + 9$, x

- (a) 2
- (b) 1
- (c) $2x$
- (d) x

20) What is the arithmetic mean of 1, 2, 3, 4,49,50 ?

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a) 50

b) 25

c) 25.5

d) 27.5

21) Find the median of the numbers 6, 18, 69, 18, 33, 46, 65, 38, 94, 46, 79, 33, 36 and 46.

a) 41

b) 44

c) 42

d) 43

22) Following are the points obtained by a Kabaddi team in a series of matches.

16, 1, 6, 26, 14, 4, 13, 7, 9, 23, 47, 9, 7, 6, 17, 27

Find the median of the marks obtained by the team.

a) 11

b) 14

c) 13

d) 12

23) Find the median of 26, 24, 27, 30, 32, 40 and 12.

a) 31

b) 27

c) 28

d) 30

24) The wickets taken by a bowler in 12 cricket matches are as follows:

3, 7, 5, 4, 6, 1, 4, 3, 2, 4, 3, 4

Find the mode of this distribution.

a) 4

b) 1

c) 2

d) 5

25) Find the median of the data -2, 5, 1, 5, -1, -4, 2, 8, 11, 6.

a) 2

b) 3.5

c) 2.75

d) 3

26) The median of the following terms 33, 13, 24, 18, 29, 26, 44 was determined:

Later it was found that 18 was written by mistake instead of 30, now what will be the changed median?

a) 29

b) 21

c) 28

d) 26

27) Find the mode of this distribution.

26, 46, 59, 88, 46, 55, 66, 13, 26, 60, 43, 61

a) 55, 26

b) 25, 45

c) 26, 46

d) 46, 55

28) Find the mode of $1, 1/2, 1/2, 3/4, 1/4, 2, 1/2, 1/4, 2/4$.

a) $1/4$

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b) $1/2$

c) $3/4$

d) 1

29) The details of the number of persons taking loans from the bank are given below based on the interval of their age group.

age group	20-30	30-40	40-50	50-60	60-70
Number of person	37	40	60	50	13

Find the mode.

a) 44.33

b) 46.67

c) 32.64

d) 30.21

30) If the standard deviation of the population is 9, what will be the variance of the population?

a) 56

b) 77

c) 39

d) 81

31) 5 out of 6 cricketers have played 12, 13, 9, 5, 11 innings respectively. If the mean of the data set is 9, then the number of innings played by that 6th player is.

a) 7

b) 9

c) 4

d) 5

32) Find the range of the figures 10, 6, 10, 4, 5, 8, 9, 5, 9, 10, 6, 10.

a) 3

b) 5

c) 6

d) 4

33) Find the range of the first 7 prime numbers.

a) 16

b) 7

c) 9

d) 15

34) Find the median, mode and mean of 10, 6, 9, 10, 10, 8, 9, 10, 9.

a) 8, 10, 9

b) 9, 9, 8

c) 9, 10, 9

d) 9, 9, 9

35) The mean of a distribution is 14 and the standard deviation is 7. What is the value of variance coefficient?

a) 50%

b) 65.74%

c) 52.84%

d) 72%

36) The average of the results of 35 tests is 20. The average of the first 17 results is 18 and the average of

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the last 17 is 22. What is the value of the result of the 18th test?

- a) 36
- b) 20
- c) 42
- d) 29

37) If the mean value of the height of 22 men is 1.65 meters and the mean height of 8 women is 1.50 meters. Then what is the sum (in meters) of the total length of 8 women?

- a) 17
- b) 12.6
- c) 13.5
- d) 12

38) Find the range of 11, 22, 6, 2, 4, 18, 20, 3.

- a) 13
- b) 16
- c) 20
- d) 10

39) The variance of 6 values is 64. If each value is doubled, find the standard deviation.

- a) 16
- b) 11
- c) 13
- d) 17

40) The mean of the figures 1, x, 6, 4, y, 9, 7 is 6, where x and y are constant. If x is replaced by $3x + 2$

and y is replaced by $y + 2$, the mean 2 increases. Find the value of x –

- a) 6
- b) 9
- c) 7
- d) 5

41) The arithmetic mean of a set of numbers is 24. The mean of another set of numbers is 30. If the combined mean of both sets is 25, what will be the ratio of frequency of the two groups?

- a) 4: 3
- b) 5: 1
- c) 2: 3
- d) 5: 4

42) Find the median of 66, 33, 56, 31, 11, 91, 50, 61, 61, 56, 92 and 5.

- a) 56.5
- b) 32
- c) 56
- d) 62

43) The mean of the digits will be based on the data given below:

Score	0	2	4	6	8	16
Number of students	6	5	4	3	2	5

- a) 6.3
- b) 5.6

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c) 3.5

d) 4.2

44) The mean of 21 observations (all different) is 60. If the value of the median is increased to 21, then the value of the observations increases, the mean of the observations will be:

a) 50

b) 50.5

c) 30

d) 45

45) Mean of an observation set x_1, x_2, \dots, x_{10} is 40. Find out mean of $x_1 + 4, x_2 + 8, \dots, x_{10} + 40$.

a) 62

b) 52

c) 82

d) 32

46) Arithmetical mean of series $y_1, y_2, y_3 + \dots y_n$ is 1, then find the arithmetical mean of $y_1/m, y_2/m, y_3/m, \dots, y_n/m$ ($m > 0$)

a) $1/m$

b) m

c) $2m$

d) $m/2$

47) Find the median of the prime numbers from 1 to 55?

a) 22

b) 20

c) 21

d) 19

48) Find the mean of the first 10 numbers in the Fibonacci series:

A Fibonacci number is the sum of the last two numbers in that series. The first two Fibonacci numbers are 0 and 1 respectively.

a) 4

b) 3

c) 5

d) 4.5

49) Find the mode of 12, 1, 10, 1, 9, 3, 4, 9, 7, 9.

a) 10

b) 12

c) 9

d) 7

50) If the mean of 3, 4, a, b, 10 is 6 and the median is 4 and $a < b$, then the values of a and b are _____ and _____ respectively.

a) 4, 6

b) 4, 9

c) 4, 7

d) 4, 5

Elementary Statistics – Answer and Explanation

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1) Answer: D

We know that:

$$\text{Mode} = 3\text{Median} - 2\text{Mean}$$

2) Answer: B

Prime numbers = 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 49

Total terms = 12

Total sum = 360

Mean = (Total sum)/(Number of terms)

Mean = $360/12$

Mean = 30

3) Answer: A

Series = 1, 2, 3 33, 34.

Total number of term (n) = 34

First term (a) = 1

Difference (d) = 1

Sum = $n \times [2a + (n-1)d] / 2$

Sum = 17×35

Sum = 595

Arithmetic mean = Sum/Total numbers = $595/34 = 17.5$

4) Answer: C

Mode = “The number which appears most of the times in a series“.

Series = $4x, 16x^3, 8x^2, 2x$ and x

Mode = no mode

5) Answer: A

Series = 2, 10, 15, 11, 5, 8

Median = “The median is the middle number or the average of middle numbers in a sorted, ascending or descending, list of numbers “

Sorted series = 2, 5, 8, 10, 11, 15

Median = $(8 + 10)/2$

Median = 9

6) Answer: C

Mode = “The number which appears most of the times in a series“.

Series = 2, 12, 15, 2, 14, 2, 10, 2

Mode = 2

7) Answer: B

Mode = “The number which appears most of the times in a series“.

Series = 1, 2, 3, 5, 4, 8, 7, 5, 1, 2, 5, 9, 15

Mode = 5

8) Answer: D

First term (a) = 2

Last term (l) = 30

this is a series of consecutive even numbers.

So, mean = $(a+l)/2$

= $(2+30)/2$

= 16

9) Answer: B

Total terms = 200

First term = 1

Last term = 200

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$$\text{mean} = (1+200)/2$$

$$= 100.5$$

10) Answer: B

$$\text{Series} = x - 1, x + 1, x - 2, x + 2, x$$

$$\text{Sum} = 5x$$

$$\text{Total terms} = 5$$

$$\text{Mean} = \text{Sum}/\text{total no. of terms}$$

$$\text{Mean} = 5x/5$$

$$\text{Mean} = x$$

11) Answer: D

$$\text{Series} = x + 10, x + 1, x - 20, x + 12, 2 - 4x$$

$$\text{Sum} = 5$$

$$\text{Total no. of terms} = 5$$

$$\text{Mean} = \text{Sum}/\text{total no. of terms}$$

$$\text{Mean} = 5/5$$

$$\text{Mean} = 1$$

12) Answer: B

Observations: 125 cm, 156 cm, 175 cm, 180 cm and 175 cm.

$$\text{Sum} = 811$$

$$\text{Total observation} = 5$$

$$\text{Mean} = \text{Sum of observation}/\text{total observation} \\ \dots\dots\dots(1)$$

$$\text{Mean} = 811/5$$

$$\text{Mean} = 162.2$$

13) Answer: D

First five numbers divisible by 2 and 3 = 6, 12, 18, 24 and 30

$$\text{Sum of observations} = 90$$

$$\text{Total observations} = 5$$

$$\text{Mean} = \text{Sum of observations}/\text{Number of observations}$$

$$\text{Mean} = 18$$

14) Answer: A

$$\text{Mode} = 3\text{Median} - 2\text{Mean}$$

$$2\text{Mean} = 3 \times 5 - 10$$

$$\text{Mean} = 2.5$$

15) Answer: C

$$\text{Range} = \text{Highest observation} - \text{Lowest observation} \\ \dots\dots\dots(1)$$

$$\text{Highest observation} = 92$$

$$\text{Lowest observation} = 65$$

$$\text{Range} = 92 - 65$$

$$\text{Range} = 27$$

16) Answer: C

$$\text{Range} = \text{Highest observation} - \text{Lowest observation} \\ \dots\dots\dots(1)$$

$$\text{Highest observation} = 192$$

$$\text{Lowest observation} = 145$$

$$\text{Range} = 192 - 145$$

$$\text{Range} = 47$$

17) Answer: A

$$\text{Smallest triplet} = 3, 4, 5.$$

$$\text{Total observation} = 3$$

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Sum of observation = 12

Mean = Sum of observation/number of observation

Mean = $12/3$

Mean = 4

18) Answer: B

Series = 5.25 , 2.50 , 1.50 , 4.50 and 5

Median = “The median is the middle number or the average of middle numbers in a sorted, ascending or descending list of numbers. “

Sorted series = 1.50 , 2.50 , 4.50 , 5.0 , 5.25

Median = 4.50

19) Answer: D

Series = $x - 1$, $x + 2$, $x - 10$, $x + 9$, x

Median = “The median is the middle number or the average of middle numbers in a sorted, ascending or descending list of numbers. “

Sorted series = $x - 10$, $x - 1$, x , $x + 2$, $x + 9$

Median = x

20) Answer: C

First term = 1

Last term = 50

Mean = $(1+50)/2$

= 25.5

21) Answer: C

Writing numbers in ascending order -

6, 18, 18, 33, 33, 36, 38, 46, 46, 46, 65, 69, 79, 94

Number of term = 14 (Even)

Median = $1/2[n/2^{\text{th}} \text{ term} + (n/2+1)^{\text{th}} \text{ term}]$

= $1/2(7^{\text{th}} \text{ term} + 8^{\text{th}} \text{ term})$

= $1/2 [38 + 46] = 42$

22) Answer: A

On writing the digits in ascending order -

1, 4, 6, 6, 7, 7, 9, 9, 13, 14, 16, 17, 23, 26, 27, 47

Total number of terms (n) = 16 is even.

Median = $[(n/2)^{\text{th}} \text{ term} + (n/2+1)^{\text{th}} \text{ term}]/2$

= $(9 + 13)/2 = 22/2 = 11$

23) Answer: B

Writing in ascending order

12, 24, 26, 27, 30, 32, 40

Number of terms = 7 (Odd)

\therefore Median = $((7+1)/2)^{\text{th}} \text{ term} = 4^{\text{th}} \text{ term} = 27$

24) Answer: A

Mode means that the number has come more often or has a higher frequency. Hence the frequency of 4 is more in the given data.

\therefore Mode of data = 4

25) Answer: B

Writing data in ascending order -

-4, -2, -1, 1, 2, 5, 5, 6, 8, 11

n = 10 (Even)

\therefore Median = $1/2 [n/2^{\text{th}} \text{ term} + (n/2+1)^{\text{th}} \text{ term}]$

= $1/2[5^{\text{th}} \text{ term} + 6^{\text{th}} \text{ term}]$

= $1/2 \times [2+5] = 3.5$

26) Answer: A

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Arranged in ascending order,

13, 24, 26, 29, 30, 33, 44

$n = 7$ (odd)

Median = $((n+1)/2)^{\text{th}}$ term

= $((7+1)/2)^{\text{th}}$ term

= 4^{th} term = 29

27) Answer: C

Given data- 26, 46, 59, 88, 46, 55, 66, 13, 26, 60, 43, 61

Maximum score of 26 is 2 times and maximum score of 46 is 2 times.

Hence desired mode is 26, 46.

28) Answer: B

\therefore The frequency of $1/2$ is the highest (3) in the data.

\therefore Mode = $1/2$

29) Answer: B

age group	Number of person
20-30	37
30-40	40
40-50	60 mode group
50-60	50
60-70	13

Here – L = Lower limit of mode group = 40

F_1 = Number of mode group = 60

F_0 = Number of group above mode group = 40

f_2 = Number of persons below group of mode group = 50

i = High limit - Lower limit (quadratic) = 10

mode (z) = $L + (f_1 - f_0)/(2f_1 - f_0 - f_2) \times I$

= $40 + ((60 - 40)/120 - 40 - 50) \times 10$

= $40 + (20/30) \times 10$

= $40 + 6.67 = 46.67$

30) Answer: D

Standard deviation of population = 9

Population variance = (Standard deviation) 2 = $(9)^2 = 81$

31) Answer: C

Total number of innings played by all five players = $6 \times 9 = 54$

Total number of innings of four players = $12 + 13 + 9 + 5 + 11 = 50$

\therefore Total number of fifth player's innings = $54 - 50 = 4$

32) Answer: C

Range of the figures = Highest value - Lowest value = $10 - 4 = 6$

33) Answer: D

First 7 prime number = 2, 3, 5, 7, 11, 13, 17

Range = maximum number - minimum number

Range = $17 - 2 = 15$

34) Answer: C

Writing data in ascending order,

6, 8, 9, 9, 9, 10, 10, 10, 10

\therefore Number of term = 9 (odd)

\therefore Median = $((n+1)/2)^{\text{th}}$ term

= $(9 + 1)/2 = 5^{\text{th}}$ term = 9

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Mode = 10 (Most often involved.)

Mean = $(6 + 8 + 9 + 9 + 9 + 10 + 10 + 10 + 10)/9$

= $81/9 = 9$

35) Answer: A

Variance coefficient = $(\text{Standard deviation} / \text{mean}) \times 100$

= $(7/14) \times 100 = 50\%$

36) Answer: B

Average of 35 tests = 20

Sum of 35 tests = $35 \times 20 = 700$

Average of 17 tests = 18

Total sum of 17 tests = $17 \times 18 = 306$

Average of last 17 tests = 22

Total = $17 \times 22 = 374$

Value of 18th test = $700 - 306 - 374 = 20$

37) Answer: D

Total sum = Number \times Mean

Total length of 8 women = $8 \times 1.50 = 12.0$ m.

38) Answer: C

Range of number = High limit - Lower limit

= $22 - 2 = 20$

39) Answer: A

Variance = σ^2

Standard deviation = $\sqrt{(\sigma^2)} = \sqrt{64}$

Standard deviation = $\sigma = 8$

New standard deviation = $\lambda\sigma$ (where $\lambda = n$ times each value)

= 2×8

= 16

40) Answer: D

Mean = Sum of digits / Sum of number

$6 = (1 + x + 6 + 4 + y + 9 + 7)/7$

$x + y + 27 = 42$

$x + y = 15$(i)

According to question,

$(27 + 3x + 2 + y + 2)/7 = 8$

$3x + y = 25$(ii)

From equation (i) and (ii) -

$x = 5$

41) Answer: B

Let the number of terms in the first set of numbers (frequency) = n_1

And the number of terms in the second set of numbers (frequency) = n_2

According to Question -

$\Rightarrow 24 \times n_1 + 30 \times n_2 = (n_1 + n_2) \times 25$

$\Rightarrow 24n_1 + 30n_2 = 25n_1 + 25n_2$

$\Rightarrow 30n_2 - 25n_2 = 25n_1 - 24n_1$

$\Rightarrow 5n_2 = n_1 \Rightarrow n_1/n_2 = 5/1$

Hence the ratio of frequency of both groups = 5: 1

42) Answer: C

Writing the given numbers in ascending order

5, 11, 31, 33, 50, 56, 56, 61, 61, 66, 91, 92

Total numbers (n) = 12 Even

Median = $[(n/2)\text{th term} + (n/2+1)\text{th term}]/2$

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$$= (6\text{th term} + 7\text{th term})/2$$

$$= (56 + 56)/2 = 56$$

43) Answer: B

Score(x)	0	2	4	6	8	16	
Number of students (f)	6	5	4	3	2	5	$\sum f = 25$
Fx	0	10	16	18	16	80	$\sum fx = 140$

$$\text{Mean} = (\sum fx) / (\sum f) = 140/25 = 5.6$$

44) Answer: A

$$\text{Total of 21 observations} = 21 \times 60 = 1260$$

$$\text{Mean of 21 observations} = 11$$

If the value of the median is increased to 21, the value of observations increases.

$$\text{Increased value of observations} = (21-11) \times 21 = 210$$

$$\text{Mean of observations} = (1260 + 210)/21$$

$$= (1260 + 210)/21 = 70$$

45) Answer: A

$$(x_1 + x_2 + x_3 + \dots + x_{10})/10 = 40$$

$$x_1 + x_2 + x_3 + \dots + x_{10} = 400 \dots\dots\dots (i)$$

$$\text{Then, mean} = (x_1 + 4) + (x_2 + 8) + (x_3 + 12) + \dots + (x_{10} + 40)/10$$

$$= (400 + 5(4 + 40))/10 \quad [\text{from eq. (i)}]$$

$$= (400 + 220)/10 = 620/10 = 62$$

46) Answer: A

$$\text{Mean} = \text{Sum of terms}/\text{number of terms}$$

$$1 = (y_1 + y_2 + y_3 + \dots + y_n)/n \quad \text{----- (I)}$$

So,

$$\text{Mean} = (y_1/m + y_2/m + \dots + y_n/m)/n$$

$$\text{Mean} = 1/m (y_1 + y_2 + y_3 + \dots + y_n)/n$$

$$\text{Hence, mean} = 1/m$$

47) Answer: C

According to question,

All prime numbers from 1 to 55 = 2, 3, 5, 7,

11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53

n = 16 even

$$\therefore \text{median} = (n/2)^{\text{th}} \text{ term} + (n/2+1)^{\text{th}} \text{ term}/2$$

$$= (16/2)^{\text{th}} \text{ term} + (16/2+1)^{\text{th}} \text{ term}/2$$

$$= 8^{\text{th}} \text{ term} + 9^{\text{th}} \text{ term}$$

$$= (19 + 23)/2$$

$$= 42/2$$

$$= 21$$

Hence the median of the total prime numbers from 1 to 55 = 21

48) Answer: A

Fibonacci series = $a_0, a_1, a_2, a_3, a_4 \dots$

where,

$$a_0 = 0$$

$$a_1 = 1$$

$$a_n = a_{(n-2)} + a_{(n-1)}$$

In this, the next number is sum of first two numbers..

So, Fibonacci numbers = 0, 1, 1, 2, 3, 5, 8, 13, 21, 34

Number of terms (n) = 10 (even)

$$\text{Median} = (5^{\text{th}} \text{ term} + 6^{\text{th}} \text{ term})/2 = (3 + 5)/2 = 4$$

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49) Answer: C

Data 12, 1, 10, 1, 9, 3, 4, 9, 7, 9 have the highest (3 times) frequencies of 9. Hence, mode of the given data is 9.

50) Answer: B

The mean of 3, 4, a, b, 10 is 6 and the median is 4

Mean = Sum of total numbers / total numbers

$$6 = (3 + 4 + a + b + 10)/5$$

$$30 = 17 + a + b$$

$$a + b = 13$$

Median is 4 -

$$\text{Median} = (5+1)/2^{\text{th}} \text{ term} = 3^{\text{rd}} \text{ term} = a = 4$$

$$a + b = 13$$

$$b = 9$$

Hence $a = 4$, $b = 9$

Mensuration

1. Find the total surface area of a spherical ball of radius 9 cm. [Use $\pi = 3.14$]

- a) 1017 cm^2
- b) 874 cm^2
- c) 946 cm^2
- d) 1020 cm^2

2. The ratio of height and radius of a cylinder is 3:1, respectively. If curved surface area of cylinder is 678 cm^2 , then find the height of cylinder. [Take $\pi = 3.14$]

- a) 18 cm
- b) 12 cm
- c) 14 cm
- d) 15 cm

3. What is the volume of a right circular cone whose height is 20 m and radius is one fourth of its height? [Use $\pi = 3.14$]

- a) 420 m^3

b) 523 m^3

c) 540 m^3

d) 660 m^3

4. Find the radius of the solid hemisphere of volume $6,750 \text{ m}^3$. (Take $\pi = 3$)

- a) 12 m
- b) 14 m
- c) 15 m
- d) 16 m

5. The height, breadth and length of a cuboidal box are 18 cm, 'x' cm and 42 cm, respectively. If the cost of painting the base of the box was Rs. 1449 at Rs. 1.50 per cm^2 , then find the value of 'x'.

- a) 23 cm
- b) 19 cm
- c) 27 cm
- d) 26 cm

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6. If the radius and height of a cylinder is decreased by 20% and 25%, respectively. Find the percentage decrease in the volume of the cylinder.
- a) 52%
 - b) 46%
 - c) 54%
 - d) 58%
7. Find the cost of painting a solid cylindrical drum having radius 14 meters and height 20 meters at the rate of Rs.15 per square meter.
- a) Rs. 42,680
 - b) Rs. 44,880
 - c) Rs. 46,080
 - d) None of these
8. Breadth of the cuboidal box is half its length and one fifth its height. Find the lateral surface area of the cuboidal box if its volume is $58,320 \text{ cm}^3$.
- a) $11,016 \text{ cm}^2$
 - b) $10,208 \text{ cm}^2$
 - c) $9,720 \text{ cm}^2$
 - d) None of these
9. A cone of radius 22 cm and height 33 cm is melted and casted in form of a cylinder of equal base, then find the height of cylinder.
- a) 33 cm
 - b) 22 cm
 - c) 11 cm
 - d) None of these
10. Find the cost of painting the total surface area of the hemisphere of radius 14 m at the rate of Rs. 12.50/m².
- a) Rs. 23,100
 - b) Rs. 21,140
 - c) Rs. 22,220
 - d) None of these
11. The height and radius of base of the right circular cone are in the ratio 4:3 respectively. If the curved surface area of the cone is 2310 cm², then find the difference in the diameter and height of the cone.
- a) 28 cm
 - b) 14 cm
 - c) 7 cm
 - d) None of these
12. A hollow cylinder of height 25 cm is unwrapped to get a rectangle of dimensions 88 cm × 25 cm. Find the volume of the cylinder.
- a) 12600 cm^3
 - b) 15400 cm^3
 - c) 16400 cm^3
 - d) 14800 cm^3

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13. Find the curved surface area of the cone of radius 5 cm and height equal to the breadth of the rectangle of area 180 cm^2 whose length and breadth are in the ratio of 5:4, respectively. [Use $\pi = 3.14$]
- a) 204 cm^2
b) 210 cm^2
c) 184 cm^2
d) None of these
14. A cylinder of radius 8 cm and height 16 cm is melted and again cast to form small cylinders of radius 2 cm and height 4 cm. Find the number of small cylinders that can be formed from the big cylinder.
- a) 42
b) 64
c) 36
d) 48
15. If the volume of the sphere is 38808 m^3 , then find the total surface area of the sphere.
- a) 5372 m^2
b) 5544 m^2
c) 5648 m^2
d) 5775 m^2
16. The total surface area of the cylinder is 1104 cm^2 . If the cost of painting the curved surface area of the cylinder is Rs. 2520 at the rate of Rs. $3.5/\text{cm}^2$, then find the radius of the cylinder. [Use $\pi = 3$]
- a) 12 cm
b) 7 cm
c) 9 cm
d) None of these
17. A toy which is in the form of hemispheres mounted on both ends of a hollow cylinder such that their bases coincide. If the length of the toy is 20 cm and the total curved surface area of the toy is 572 cm^2 , then find the height of the cylinder.
- a) 8.8 cm
b) 10.9 cm
c) 9.1 cm
d) 9 cm
18. If the ratio of the curved surface area of a cylinder to its total surface area is 1:3 respectively, then find the ratio of radius of cylinder to the height of cylinder.
- a) 2:1
b) 3:2
c) 1:3
d) 2:3
19. A spherical ball is melted and casted into three small spherical balls of radius 3 cm, 4 cm and 5 cm, find the radius of big spherical ball.

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- a) 4 cm
b) 5 cm
c) 6 cm
d) 8 cm
20. If a cone of radius 16 cm and height 32 cm is melted and casted in the form of a hemisphere, then find the radius of hemisphere.
- a) 14 cm
b) 12 cm
c) 16 cm
d) 18 cm
21. Find the total surface area of a hemispherical bowl whose radius is twice the side of an equilateral triangle having area $16\sqrt{3} \text{ cm}^2$. [Use $\pi = 3$]
- a) 2642 cm^2
b) 2304 cm^2
c) 2456 cm^2
d) 2248 cm^2
22. Find the maximum volume of the cone that can be cut out from the cylinder of radius 7 cm and height 24 cm.
- a) 1232 cm^3
b) 1472 cm^3
c) 1156 cm^3
d) 1636 cm^3
23. The radius of a right circular cone and a right circular cylinder are in the ratio 6:5, respectively and their heights are in the ratio 5:3, respectively. Find the ratio of the volume of cone to that of cylinder.
- a) 4:5
b) 2:1
c) 3:2
d) 3:1
24. The cost of painting the curved surface area of the cone at the rate of Rs. 2.5 per cm^2 is Rs. 1800. If the radius of the cone is 12 cm, then find the height of the cone. (Use $\pi = 3$)
- a) 16 cm
b) 20 cm
c) 35 cm
d) 5 cm
25. If the total surface area and curved surface area of the cylinder is 836 cm^2 and 528 cm^2 , respectively. Find the height of the cylinder.
- a) 21 cm
b) 14 cm
c) 12 cm
d) None of these
26. A solid spherical ball of volume 38808 cm^3 is broken into two equal halves. Find the increase in the total surface area of both

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hemispheres with respect to the sphere (in cm^2).

- a) 2772 cm^2
- b) 2277 cm^2
- c) 2727 cm^2
- d) 2722 cm^2

27. Find the area of the circle whose radius is equal to the side of cube of volume 729 cm^3 .

(Take $\pi = 3$)

- a) 192 cm^2
- b) 243 cm^2
- c) 272 cm^2
- d) 157 cm^2

28. The ratio of the radius of the cylinder to its height is 1:2. If the volume of the cylinder is 1296 cm^3 , then find the radius of the cylinder.

[Use $\pi = 3$]

- a) 4 cm
- b) 6 cm
- c) 7 cm
- d) 8 cm

29. A cylindrical vessel has radius 12 cm and height 18 cm. Find the cost of painting the lateral surface of the vessel at the rate of Rs. 5 per cm^2 . ($\pi = 3$)

- a) Rs. 6840
- b) Rs. 6480

c) Rs. 6520

d) Rs. 6750

30. What is the height of a cone of radius 15 cm and curved surface area 255π ?

- a) 8 cm
- b) 13 cm
- c) 17 cm
- d) 5 cm

31. The ratio of the radius of two circles is 2 : 3. The perimeter of the smaller circle is 88 cm. Find the perimeter of bigger circle?

- a) 132 cm
- b) 105 cm
- c) 176 cm
- d) 142 cm

32. The volume of a cylinder is 594 cm^3 and its height is 21 cm. Find the radius of the cylinder?

- a) 9 cm
- b) 3 cm
- c) 12 cm
- d) 6 cm

33. The perimeter of a rectangle is 132 cm and the difference between its length and breadth is 10 cm. Find its area? Note: Length > Breadth.

- a) 1064 cm^2
- b) 1032 cm^2

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c) 1012 cm^2

d) 1832 cm^2

34. The ratio between the radius of a circle and the side of a square is $7 : 5$ and the circumference of the circle is 176 cm . Find the area of square ?

a) 169 cm^2

b) 729 cm^2

c) 400 cm^2

d) 900 cm^2

35. The length and breadth of a rectangle is in the ratio of $5 : 2$ and its area is 640 cm^2 then find its length and breadth?

a) 40 cm & 16 cm

b) 40 cm & 8 cm

c) 32 cm & 16 cm

d) None of these

36. The ratio of area of a circle and its circumference is $15 : 2$ then find the circumference of the circle?

a) 28.64 cm

b) 92.64 cm

c) 74.64 cm

d) 94.28 cm

37. The radius of a circle and side of a square is in the ratio of $7 : 9$ and the circumference of the circle is 176 cm . Find the area of the square ?

a) 1225 cm^2

b) 8100 cm^2

c) 1681 cm^2

d) 1296 cm^2

38. The height and radius of a cylinder are in the ratio of $280 : 105$ and its curved surface area is 1848 cm^2 . Find the height of the cylinder ?

a) 28 cm

b) 07 cm

c) 14 cm

d) 21 cm

39. The side of a square is 1.5 times of the radius of a circle whose area is 616 cm^2 . Find the perimeter of the square?

a) 132 cm

b) 84 cm

c) 42 cm

d) 66 cm

40. The length of a rectangle is 10 cm more than breadth which is equal to the side of an equilateral triangle of area $16\sqrt{3} \text{ cm}^2$. Find the area of rectangle?

a) 316 cm^2

b) 216 cm^2

c) 128 cm^2

d) 144 cm^2

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41. The ratio of the side of a square, length and breadth of a rectangle is 1 : 2 : 1. The difference between the length and breadth of the rectangle is 8 cm then find the perimeter of square?
- a) 56 cm
 - b) 32 cm
 - c) 44 cm
 - d) 24 cm
42. The ratio between the side of a square, length and breadth of a rectangle is 1 : 2 : 3 and the difference between the length of rectangle and side of square is 10 cm. Find the perimeter of rectangle?
- a) 156 cm
 - b) 100 cm
 - c) 144 cm
 - d) 244 cm
43. The perimeter of the rectangle is 132 cm and the length of rectangle is 12 cm more than its breadth. Find its area?
- a) 1680 cm^2
 - b) 1064 cm^2
 - c) 1053 cm^2
 - d) 1024 cm^2
44. The side of a square is twice to the radius of a circle whose circumference is 176 cm. Find the perimeter of square?
- a) 325 cm
 - b) 336 cm
 - c) 324 cm
 - d) 224 cm
45. The radius of a cone is increased by 10% by what percent its height must be decreased to keep its volume same as before?
- a) 9.09%
 - b) 10%
 - c) 11.11%
 - d) Cannot be determined
46. Find the radius of a cylinder if its volume is 3096 cm^3 and radius is 20% more than its height?
- a) $6 \times (5.47)^{1/3} \text{ cm}$
 - b) 15 cm
 - c) 15.98 cm
 - d) 14.28 cm
47. If the volume of a cone is 1296 cm^3 and the diameter of the base is 14 cm then find the curved surface area of the cone?
- a) 174 sq. cm^2
 - b) 274 cm^2
 - c) 474 cm^2
 - d) 572 cm^2
48. The sides of a parallelogram are 12 cm and 10 cm and It's one diagonal is 8 cm then find the other diagonal?

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a) $2\sqrt{106}$ cm

b) $4\sqrt{14}$ cm

c) $\sqrt{14}$ cm

d) $8\sqrt{14}$ cm

49. If the radius of a cylinder is 50% of the height of a cylinder then find the volume of the cylinder ?
(Given : height is 10 cm more than radius.)

a) 6185.71 cm^3

b) 6258.71 cm^3 .

c) 6285.71 cm^3 .

d) 6201.71 cm^3 .

50. The volume of a cylinder is 100π and the ratio of radius to its height is 5 : 4. Find the curved surface area of cylinder?

a) 400π sq. unit

b) 40 sq. unit

c) 40π sq. unit

d) 140π sq. unit

Mensuration – Answer and Explanation

1) Answer: A

Total surface area of sphere = $4\pi r^2$, where r is the radius.

$$= 4 \times 3.14 \times 9^2 = 1017 \text{ cm}^2$$

2) Answer: A

Let, height and radius of the cylinder be '3x' cm and 'x' cm, respectively.

$$\text{So, } 2 \times 3.14 \times 3x^2 = 678$$

$$x = \sqrt{36} = 6$$

$$\text{So, height of cylinder} = 3x = 18 \text{ cm}$$

3) Answer: B

$$\text{Radius of cone} = \frac{1}{4} \times 20 = 5 \text{ m}$$

Volume = $(\frac{1}{3}) \pi r^2 h$, where r is the radius and h is the height of cone.

$$= \frac{1}{3} \times 3.14 \times 5^2 \times 20 = 523 \text{ m}^3$$

4) Answer: C

$$\text{Volume of hemisphere} = \frac{2}{3} \times \pi \times r^3$$

$$\text{Radius of hemisphere} = (6750/2)^{1/3} = 15 \text{ m}$$

5) Answer: A

$$\text{Area of the base} = l \times b = 42 \times x$$

$$42 \times x = 1449 / 1.5$$

$$\text{So, } x = 23 \text{ cm}$$

6) Answer: A

Let, radius and height of cylinder be 'r' and 'h', respectively.

$$\text{Decreased radius} = 0.8r$$

$$\text{Decreased height} = 0.75h$$

$$\text{So, original volume} = \pi r^2 h$$

$$\text{Decreased volume} = \pi \times (0.8r)^2 \times 0.75h = 0.48\pi r^2 h$$

$$\text{So, required percentage} = \{(\pi r^2 h - 0.48\pi r^2 h) / \pi r^2 h\} \times 100 = 52\%$$

7) Answer: B

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$$\text{Total surface area of cylinder} = 2 \times \pi \times r \times (h + r) = 2 \times 22/7 \times 14 \times (20 + 14) = 88 \times 34 = 2992 \text{ m}^2$$

$$\text{So the cost of painting} = 2992 \times 15 = \text{Rs. } 44,880$$

8) Answer: C

$$\text{Let the breadth of the cuboidal box} = x \text{ cm}$$

$$\text{Length of the cuboidal box} = 2x \text{ cm}$$

$$\text{Height of the cuboidal box} = 5x \text{ cm}$$

$$\text{So the volume of the box} = x \times 2x \times 5x = 58320$$

$$10x^3 = 58320$$

$$x^3 = 5832, x = 18$$

So the length, breadth and the height of the box are 36 cm, 18 cm and 90 cm respectively.

$$\text{So the lateral surface area of the box} = 2 \times 90 \times (18 + 36) = 9,720 \text{ cm}^2$$

9) Answer: C

Let 'r', 'h' and 'H' denote the radius of the cone, height of the cone and height of the cylinder respectively.

According to question,

$$\text{Volume of cone} = \text{Volume of cylinder}$$

$$(1/3) \times \pi \times r^2 \times h = \pi \times r^2 \times H$$

$$H = (1/3) \times 33$$

$$H = 11 \text{ cm}$$

10) Answer: A

$$\text{Total surface area of the hemisphere} = 3 \times (22/7) \times 14^2 = 1,848 \text{ m}^2$$

$$\text{So, required cost of painting} = 1848 \times 12.50 = \text{Rs. } 23,100$$

11) Answer: B

Let the radius of base and the height of the cone be '3x' cm and '4x' cm respectively

$$\text{So, the slant height of the cone} = \sqrt{\{(3x)^2 + (4x)^2\}} = \sqrt{9x^2 + 16x^2} = \sqrt{25x^2} = 5x \text{ cm}$$

$$\text{So, the curved surface area of the cone} = 22/7 \times 3x \times 5x = 2310$$

$$15x^2 = 735$$

$$x^2 = 49$$

$$x = 7$$

So, the radius and height of the cone are 21 cm and 28 cm respectively.

$$\text{Desired difference} = 21 \times 2 - 28 = 14 \text{ cm}$$

12) Answer: B

When a hollow cylinder is unwrapped,

Breadth of the rectangle = Height of the cylinder

$$\text{So, height of cylinder} = 25 \text{ cm}$$

Also, length of the rectangle = circumference of base of the cylinder

$$88 = 2 \times (22/7) \times r$$

$$r = 14 \text{ cm}$$

$$\begin{aligned} \text{Thus, volume of the cylinder} &= (22/7) \times r^2 \times h \\ &= (22/7) \times (14)^2 \times 25 \\ &= 15400 \text{ cm}^3 \end{aligned}$$

13) Answer: A

Let the length and breadth of the rectangle be '5x' cm and '4x' cm, respectively.

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According to question,

$$5x \times 4x = 180$$

$$20x^2 = 180$$

$$x^2 = 9$$

$$x = 3$$

$$\text{So, breadth of rectangle} = 4x = 12 \text{ cm}$$

$$\text{Curved surface area of the cone} = \pi \times 5 \times (12^2 + 5^2)^{0.5}$$

$$= 3.14 \times 5 \times 13 = 204 \text{ cm}^2$$

14) Answer: B

$$\text{Required number of cylinders that can be formed} = (\pi \times$$

$$8^2 \times 16) / (\pi \times 2^2 \times 4)$$

$$= 64$$

15) Answer: B

Let the radius of the sphere be 'r' meters.

$$\text{Volume of the sphere} = 38808$$

$$(4/3) \times (22/7) \times r^3 = 38808$$

$$r^3 = 9261$$

$$r = 21 \text{ cm}$$

$$\text{So, the total surface area of the sphere} = 4 \times (22/7) \times$$

$$21^2 = 5544 \text{ m}^2$$

16) Answer: D

$$\text{Total surface area of the cylinder} = 1104 \text{ cm}^2$$

$$\text{Curved surface area of the cylinder} = 2520/3.5 = 720$$

$$\text{cm}^2$$

$$\text{So, } 2\pi rh + 2\pi r^2 - 2\pi rh = 1104 - 720$$

$$2\pi r^2 = 384$$

$$r^2 = 384/6 = 64$$

$$r = 8 \text{ cm}$$

So, the radius of the cylinder is 8 cm

17) Answer: B

Let the radius of the cylinder (or hemisphere) be 'r' cm

and the height of the cylinder be 'h' cm.

$$\text{Then, } 2r + h = 20$$

$$h = 20 - 2r.$$

$$\text{Also, Total CSA of the toy} = 572 \text{ cm}^2$$

$$2 \times \pi \times r^2 + 2 \times \pi \times r \times h + 2 \times \pi \times r^2 = 572$$

$$4 \times \pi \times r^2 + 2 \times \pi \times r \times (20 - 2r) = 572$$

$$4 \times \pi \times r^2 + 40 \times \pi \times r - 4 \times \pi \times r^2 = 572$$

$$r = 4.55 \text{ cm}$$

$$\text{Thus, height of the cylinder} = 20 - 2 \times 4.55 = 10.9 \text{ cm}$$

18) Answer: A

Let, r and h be the radius and height of cylinder respectively.

So, according to question,

$$2\pi rh / 2\pi r (h + r) = 1/3$$

$$h: (h + r) = 1: 3$$

$$3h = h + r$$

$$2h = r$$

$$r : h = 2:1$$

19) Answer: C

Let the radius of spherical ball be 'r' cm.

$$\text{Volume of bigger sphere} = (4/3) \times \pi \times r^3$$

So, according to question,

$$(4/3) \times \pi \times r^3 = (4/3) \pi \times 3^3 + (4/3) \pi \times 4^3 + (4/3) \pi \times 5^3$$

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$$r^3 = 27 + 64 + 125$$

$$r^3 = 216$$

$$r = 6 \text{ cm}$$

20) Answer: C

According to question,

Volume of cone = Volume of hemisphere

$$\left(\frac{1}{3}\right) \times \pi \times (\text{radius of cone})^2 \times \text{height of cone} = \left(\frac{2}{3}\right) \pi \times (\text{radius of hemisphere})^3$$

$$16^2 \times 32 = 2 \times (\text{radius of hemisphere})^3$$

$$(\text{Radius of hemisphere})^3 = 16^3$$

$$\text{Radius of hemisphere} = 16 \text{ cm}$$

21) Answer: B

$$\text{Area of equilateral triangle} = \left(\frac{\sqrt{3}}{4}\right) \times \text{side}^2$$

$$\left(\frac{\sqrt{3}}{4}\right) \times \text{side}^2 = 16\sqrt{3}$$

$$\text{side}^2 = 64$$

$$\text{side} = 8 \text{ cm}$$

$$\text{So, radius of hemispherical bowl} = 8 \times 2 = 16 \text{ cm}$$

$$\text{Total surface area of the hemispherical bowl} = 3 \times \pi \times r^2$$

$$= 3 \times 3 \times 16^2$$

$$= 2304 \text{ cm}^2$$

22) Answer: A

$$\text{Volume of cylinder} = \pi \times r^2 \times h$$

$$= \left(\frac{22}{7}\right) \times 7^2 \times 24$$

$$= 3696 \text{ cm}^3$$

So, maximum volume of cone the cone that can be cut

out = $\left(\frac{1}{3}\right)^{\text{rd}}$ of the volume of the cylinder

$$= \left(\frac{1}{3}\right) \times 3696 = 1232 \text{ cm}^3$$

23) Answer: A

Let the radius of the cone and cylinder be '6r' and '5r' respectively.

Let the heights of cone and cylinder be '5h' and '3h' respectively.

$$\text{So, the volume of cone} = \frac{1}{3} \times \pi \times (6r)^2 \times 5h = 60\pi \times h \times r^2$$

$$\text{Volume of cylinder} = \pi \times (5r)^2 \times 3h = 75\pi \times h \times r^2 \text{ cm}^3$$

$$\text{Ratio of the volume of cone and cylinder} = 60\pi \times h \times r^2 : 75\pi \times h \times r^2 = 60 : 75 = 4 : 5$$

24) Answer: A

Let the radius, height, and slant height of the cone be 'r', 'h' and, 's' cm respectively.

$$\text{Given, } r = 12 \text{ cm}$$

$$\text{Curved surface of the cone} = 1800/2.5 = 720 \text{ cm}^2$$

$$\pi \times r \times l = 720$$

$$3 \times 12 \times l = 720$$

$$l = 20 \text{ cm}$$

$$\text{So, the height of the cone, } h = (l^2 - r^2)^{0.5}$$

$$= (20^2 - 12^2)^{0.5} = 16 \text{ cm}$$

25) Answer: C

Let, the radius and height of the cylinder be 'r' and 'h' cm, respectively.

$$\text{Total surface area of the cylinder} = 2 \times \pi \times r \times h + 2 \times \pi \times r^2 = 836 \text{ ----(1)}$$

$$\text{Curved surface area of the cylinder} = 2 \times \pi \times r \times h = 528 \text{ ----(2)}$$

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Subtracting equation (2) from equation (1), we get

$$2 \times \pi \times r^2 = 308$$

$$2 \times (22/7) \times r^2 = 308$$

$$r^2 = 49$$

$$r = 7 \text{ cm}$$

Putting the value of 'r' in eq. (2), we get

$$2 \times (22/7) \times 7 \times h = 528$$

$$h = 12 \text{ cm}$$

So, the height of the cylinder is 12 cm.

26) Answer: A

Let the radius of the sphere be 'r' cm.

Given, Volume of sphere = 38808 cm^3

$$(4/3) \times \pi \times r^3 = 38808$$

$$r^3 = 9261$$

$$r = 21 \text{ cm}$$

Now, total surface area of sphere before breaking into two halves = $4\pi r^2$

$$\text{Total surface area of two hemispheres} = 2 \times 3\pi r^2 = 6\pi r^2$$

$$\begin{aligned} \text{Thus, increase in total surface area} &= 6\pi r^2 - 4\pi r^2 = 2\pi r^2 \\ &= 2772 \text{ cm}^2 \end{aligned}$$

27) Answer: B

Let the side of the cube be 'x' cm.

$$x^3 = 729, x = 9 \text{ cm}$$

So, radius of the circle, $r = 9 \text{ cm}$

$$\text{Area of the circle} = \pi r^2 = 3 \times 9^2 = 243 \text{ cm}^2$$

28) Answer: B

Let the radius of the cylinder be 'x' cm.

Then, height of the cylinder = $2x \text{ cm}$

$$\text{Volume of cylinder} = \pi r^2 h = 1296$$

$$3 \times x^2 \times 2x = 1296$$

$$x^3 = 216, x = 6$$

Required radius of cylinder = 6 cm

29) Answer: B

$$\text{Lateral surface area of vessel} = 2 \times 3 \times 12 \times 18 = 1296 \text{ cm}^2$$

$$\text{Required cost of painting} = 1296 \times 5 = \text{Rs. } 6480$$

30) Answer: A

$$\pi \times 15 \times l = 255\pi, l = 17 \text{ cm}$$

$$h = (17^2 - 15^2)^{0.5} = 8 \text{ cm}$$

31) Answer: A

Solution: According to the question.

Let the radius of smaller circle = $2x$ and the radius of bigger circle = $3x$

$$\text{Perimeter of smaller circle} = 88 \text{ cm}$$

$$2 \times \pi \times 2x = 88$$

$$\Rightarrow x = 7$$

$$\text{Radius of smaller circle} = 14 \text{ cm}$$

$$\text{Radius of bigger circle} = 21 \text{ cm}$$

$$\text{So, perimeter of bigger circle} = 2 \times \pi \times 21 = 132 \text{ cm}$$

32) Answer: B

Solution: According to the question.

$$\text{Volume of cylinder} = \pi r^2 h$$

$$594 = (22 \times r^2 \times 21) / 7$$

On solving -

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$r = 3 \text{ cm.}$

33) Answer: A

Solution: According to the question.

Perimeter of rectangle = $2 \times (\text{length} + \text{Breadth})$
.....(1)

Perimeter = 132 cm

$L + B = 66 \text{ cm}$ (2)

$L - B = 10 \text{ cm}$ (3)

After Solving equation (2) and equation(3) we get

Length = 38 cm

Breadth = 28 cm

Area of rectangle = Length x breadth(4)

Area of rectangle = 1064 cm^2

34) Answer: C

Solution: According to the question.

Radius of circle: Side of square = $7x : 5x$

Circumference = 176 cm

Circumference = $2\pi r$

$2\pi r = 176$

$\Rightarrow r = 28$

Radius(r) = 28 cm

So, side of square = $28 \times \frac{5}{7} = 20 \text{ cm}$

Area of square = (Side x Side) = 400 cm^2

35) Answer: A

Solution: According to the question.

Length : breadth = $5x : 2x$ (1)

Area of the rectangle = Length x Breadth
.....(2)

$10x^2 = 640$

$x = 8$

Length of rectangle = $5x = 40 \text{ cm.}$

Breadth of rectangle = $2x = 16 \text{ cm.}$

36) Answer: D

Area of circle : Circumference of circle = $15 : 2$

$(\pi r^2) : (2\pi r) = 15 : 2$

$r = 15 \text{ cm}$

Circumference of circle = $2\pi r$

Circumference of circle = 94.28 cm

37) Answer: D

Circumference of circle = 176 cm

$2 \times 22 \times R / 7 = 176 \text{ cm}$

$R = 28 \text{ cm}$ (1)

Side : Radius = $9x : 7x$ (2)

$7x = 28 \text{ cm}$

$9x = 36 \text{ cm}$

Side of square = 36 cm.

Area of square = side x side

Area of square = 1296 cm^2

38) Answer: A

Solution: According to the question.

Radius: Height = $105 : 280$ (1)

curved surface area of cylinder = $2\pi rh$ (2)

$(2 \times 22 \times 280 \times 105) = 1848 \times 7$

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$$y = 0.1$$

$$\text{Height of cylinder} = 280y = 28\text{cm.}$$

39) Answer: B

$$\text{Area of circle} = 616 \text{ cm}^2$$

$$(22 \times r \times r) / 7 = 616$$

$$r = 14$$

$$\text{Radius of circle} = 14 \text{ cm}$$

$$\text{Side : Radius} = 3 : 2 \dots\dots\dots(1)$$

$$2x = 14 \text{ cm}$$

$$3x = 21 \text{ cm}$$

$$\text{Side of square} = 21 \text{ cm.}$$

$$\text{Perimeter of square} = 4 \times \text{Side of square}$$

$$\text{Perimeter of square} = 4 \times 21 = 84 \text{ cm.}$$

40) Answer: D

$$\text{Area of equilateral triangle} = 16\sqrt{3} \dots\dots\dots(1)$$

$$\sqrt{3} \times \text{side}^2 / 4 = 16\sqrt{3}$$

$$\text{Side} = 8 \text{ cm.}$$

$$\text{Breadth of a rectangle} = 8 \text{ cm.}$$

$$\text{Length of a rectangle} = 18 \text{ cm.}$$

$$\text{Area of rectangle} = \text{Length} \times \text{Breadth}$$

$$\text{Area of rectangle} = 144 \text{ cm}^2$$

41) Answer: B

$$\begin{aligned} \text{Side of square: Length of rectangle : Breadth of} \\ \text{rectangle} = 1 : 2 : 1 \dots\dots\dots(1) \end{aligned}$$

$$\text{Difference of length and breadth of rectangle} = 1 \text{ unit}$$

$$\text{Actual difference} = 8 \text{ cm}$$

$$\text{so, 1 unit} = 8\text{cm}$$

$$\text{so, Side of square} = 8 \text{ cm}$$

$$\text{Perimeter of Square} = 4 \times \text{side}$$

$$\text{Perimeter of Square} = 32 \text{ cm}$$

42) Answer: B

$$\begin{aligned} \text{Side of square: Length of rectangle : breadth of} \\ \text{rectangle} = 1 : 2 : 3 \dots\dots\dots(3) \end{aligned}$$

$$\text{Difference} = 1 \text{ unit}$$

$$\text{Actual difference} = 10 \text{ cm}$$

$$1 \text{ unit} = 10 \text{ cm}$$

$$\text{Length of rectangle} = 20 \text{ cm}$$

$$\text{Breadth of rectangle} = 30 \text{ cm}$$

$$\text{Perimeter of Rectangle} = 2 \times (\text{length} + \text{Breadth})$$

$$\text{Perimeter of rectangle} = 100 \text{ cm}$$

43) Answer: C

$$\text{Perimeter of rectangle} = 2 \times (L + B)$$

$$L = B + 12$$

$$L - B = 12 \dots\dots\dots(1)$$

$$132 = 2 \times (L + B)$$

$$L + B = 66 \text{ cm} \dots\dots\dots(2)$$

By solving this two equations we get

$$\text{Length (L)} = 39 \text{ cm}$$

$$\text{Breadth} = 27 \text{ cm}$$

$$\text{Area of rectangle} = \text{Length} \times \text{Breadth}$$

$$\text{Area of rectangle} = 39 \times 27$$

$$\text{Area of rectangle} = 1053 \text{ cm}^2$$

44) Answer: D

$$\text{Circumference of a circle} = 176 \text{ cm}$$

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$$2\pi R = 176$$

$$R = 28 \text{ cm.}$$

$$\text{Side of square} = 2 \times \text{radius of circle}$$

$$\text{Side of square} = 56 \text{ cm}$$

$$\text{Perimeter of square} = 4 \times \text{Side}$$

$$\text{Perimeter of square} = 224 \text{ cm}$$

45) Answer: A

$$\text{Volume of cone} = \pi r^2 h / 3$$

	Before	After
Radius	10x:	11x
Height	11y:	10y
Volume	110xy :	110xy

$$\text{Difference} = 1y$$

$$\text{Percentage decrease} = (1y/11y) \times 100$$

$$\text{Percentage change} = 9.09\%$$

46) Answer: A

$$\text{Volume of cylinder} = \pi r^2 h$$

According to the question

$$\text{radius : height} = 6:5$$

$$3096 = (22 \times 6y \times 5y) / 7$$

$$y^3 = 5.47$$

$$y = 5.47^{1/3}$$

$$\text{Radius} = 6 \times (5.47)^{1/3}$$

47) Answer: D

Solution: According to the question

$$\text{Volume of cone} = 1296 \text{ cm}^3$$

$$\pi r^2 h / 3 = 1296$$

$$h = 25 \text{ cm (approx)}$$

$$\text{Curved surface area} = \pi r L$$

$$L = \text{slant height}$$

$$L = \sqrt{h^2 + r^2}$$

$$L = 26 \text{ cm (approx)}$$

$$\text{CSA} = 572 \text{ cm}^2 \text{ (approx)}$$

48) Answer: A

$$\text{Let the two diagonals be } d_1 = 8 \text{ cm \& } d_2 = x \text{ cm}$$

We know that,

$$8^2 + x^2 = 2(12^2 + 10^2)$$

$$x = 2 \sqrt{106} \text{ cm}$$

49) Answer: C

$$\text{Radius: Height} = 1 : 2$$

$$\text{Difference} = 1 \text{ unit}$$

$$1 \text{ unit} = 10 \text{ cm}$$

$$\text{Height} = 20 \text{ cm \& Radius} = 10 \text{ cm}$$

$$\text{Volume of the cylinder} = \pi r^2 h$$

$$\text{Volume of cylinder} = 6285.71 \text{ cm}^3.$$

50) Answer: C

$$\text{Volume of cylinder} = 100\pi$$

$$\pi r^2 h = 100\pi$$

$$r^2 h = 100 \text{ units}$$

$$25x^2 \cdot 4x = 100 \text{ units}$$

$$x^3 = 1$$

$$x = 1$$

$$\text{Radius} = 5 \text{ units \& height} = 4 \text{ units.}$$

$$\text{Curved surface} = 2\pi r h$$

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Curved surface = 40π sq. unit

Profit and Loss

1) The cost price of 15 articles is equal to the selling price of 20 articles. Then the profit or loss percentage is-

- a) 50
- b) 20
- c) 25
- d) 33.33

2) In Spar hypermarket during Durga puja there was an offer buy 3 get 2 free. But due to lack of sale, an additional discount of 16.67 % was offered. If a person buys this product find the net discount he gets?

- a) 45%
- b) 50%
- c) 60%
- d) 40%

3) The metallic gauge of a plastic wire dealer expands by 40% in the summer. To counter this he marks up his price 60%. Then find his profit percentage?

- a) 14.28
- b) 28.56
- c) 7.14
- d) 3.57

4) Mr. Matthew marks up his goods by 20% and then uses a faulty weight of 300gm in place of 500gm, and then gives a discount of 50% to his customers. What is his profit or loss %?

- a) 100%
- b) 75%
- c) No profit no loss
- d) 25%

5) The cost of 4 markers and 3 pencils is Rs 113 and the cost of 7 markers and 4 pencils is Rs 184. Find the cost of 2 Markers and 1 pencil?

- a) 92
- b) 56
- c) 51
- d) 41

6) A person has bought some candies at the rate of 6 per rupee and the same number at the rate of 4 per rupee. He mistakenly mixed both of them and sold this mixture at the rate of 8 per rupees. In this transaction he incurred a loss of Rs 24. Then find the number of candies bought by him?

- a) 192
- b) 144
- c) 288

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d) 180

7) The profit is 300% of the cost price. If the cost increases by 25% but the selling price remains constant, approximately profit is what percentage of the selling price?

a) 67%

b) 63.5%

c) 68.75%

d) 65%

8) Anuj purchased one dozen pencils for Rs. 60 .Pack them into boxes with three pencils in each box and sold boxes for 18 each. Find her profit percentage?

a) 20 %.

b) 25 %.

c) $16\frac{2}{3}$ %

d) $33\frac{1}{3}$ %

9) The difference in selling price of an article at a profit of 8% and 10% is Rs. 3. What will be the selling price when the profit is 8%?

a) Rs.162

b) RS.165

c) Rs.150

d) Rs.145

10) A wholesaler purchased 14 balloons for Rs.2. How many balloons he must sell for a rupee to get a profit of 40 %?

a) 6

b) 5

c) 4

d) 3

11) Dhanush sold a pen at Rs. 36 with a profit of 20% if it were sold at Rs. 33 than what could be percentage of profit and loss?

a) 10% profit

b) 12 % loss

c) 12 %profit

d) 18 % loss

12) A shopkeeper buys some number of articles at the rate of 12 for Rs.15 and sold them at the rate of 10 for Rs.14. Then the profit / loss percentage is-

a) 16

b) 12

c) 15

d) 18

13) A shopkeeper cheats to the extent of 11 % while buying and selling rice. What is his total gain percentage?

a) 24.46 %

b) 23.21 %

c) 26.24 %

d) 22 %

14) By selling 156 books a shopkeeper incurs a loss is equal to selling price of 12 books. Find his loss percentage?

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- a) $7\frac{1}{7}\%$
- b) $14\frac{1}{7}\%$
- c) $7\frac{1}{13}\%$
- d) $14\frac{1}{13}\%$

15) When the profit is calculated on cost price it is 25% of cost price. Then find the percent of profit, when calculated on selling price?

- a) 25%
- b) $23\frac{1}{2}\%$
- c) 20%
- d) $16\frac{2}{3}\%$

16) A shopkeeper sold an article at loss of 7% if he had sold it at Rs. 64 more then he got the profit of 9% the cost price of the article is-

- a) 300
- b) 400
- c) 500
- d) 600

17) An article was sold for Rs 3600 at a discount of 10%. Find the selling price if the discount was 15%?

- a) 3600
- b) 3800
- c) 4000
- d) 3400

18) Ranjit sold a dozen of watches for Rs59.25 per watch and made a profit of 25%. Find the cost price of the watches?

- a) 476
- b) 586.8
- c) 568.8
- d) 566.8

19) A farmer purchased a piece of land for Rs 16.5 lakh and spent Rs. 50,000 on registration. He sold it for Rs 21 lakhs. Find his profit in percentage?

- a) 57.12
- b) 23.53
- c) 48.6
- d) 20.56

20) A shopkeeper sold an article at loss of 9 % if he had sold it at 51 rupees more then he got the profit of 8 %, then the selling price of the article if it is sold at 25% profit is-

- a) 425
- b) 360
- c) 400
- d) 375

21) A shopkeeper purchased some number of articles at the rate of 4 for Rs.3 and the same number of articles at the rate of 3 Rs.2 and sold all the articles at the rate of 3 for Rs.5 then the profit or loss percentage is-

- a) 35.29
- b) 135.29
- c) 130

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d) 235.29

22) A shopkeeper sells some number of articles at the cost price but he uses less weight, he uses 800gm in place of 1000gm then the profit percentage is -

a) 20

b) 25

c) 10

d) 15

23) A shopkeeper losses 20% by selling 60 toffees for Rs 50. How many toffees should he sell for Rs 25 to gain 20%?

a) 30

b) 25

c) 20

d) 22

24) A shopkeeper sells an item at the profit of 120% of the cost. If the cost price increases by 10% but the selling price remains constant, approximately what percentage of the selling price is the profit?

a) 50%

b) 70%

c) 55 %

d) 60%

25) In what ratio must water be mixed with milk to gain 10% by selling the mixture at cost price?

a) 1 : 11

b) 1 : 10

c) 10 : 1

d) 11 : 1

26) A shopkeeper sells an article at the profit of 50% if he had purchased it at 20% less than cost price and sold it at 60 rupees less than cost price in the way he get the profit of 50% Find the Cost price

a) 500

b) 400

c) 200

d) 800

27) A shopkeeper purchase two articles for rupees 2100 he sold one at 10% loss and other at 20% profit and selling price of both the article is equal. Find the cost price of first article?

a) 1200

b) 900

c) 600

d) 1500

28) Radha sold a home decorate at 8 % profit had it been sold for Rs. 48 more, the gain would have been 16%. Find the cost price of the purse?

a) Rs.400

b) Rs.200

c) Rs.600

d) Rs.300

29) Price of 42 bananas is Rs. 63. Find the cost price of 9 dozen bananas?

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a) Rs. 135

b) Rs. 162

c) Rs. 84

d) Rs. 49

30) How much percentage of the cost price should be increased so that the shopkeeper mark his good so that after giving a discount of 10% on marked price he still gain 17% ?

a) 30%

b) 27%

c) 20%

d) 17%

31) A shopkeeper sold an article at the profit of 20% on selling price, the actual profit percentage

a) 25

b) 20

c) 15

d) 30

32) Apurv bought a mobile at 15 % discount on marked price he should it at 4625 with 25 % profit on marked price. At what price did he buy the mobile?

a) Rs. 3700

b) Rs. 3165

c) Rs.3145

d) Rs. 3265

33) A shopkeeper sold an article at the profit of 25 % on cost price, the profit percentage on selling price is -

a) 20

b) 25

c) $16 \frac{2}{3}$

d) 30

34) A shopkeeper sold an article at the profit of 50 % on Cost Price, the 25% of profit percentage on Selling Price is -

a) 20

b) $25/3$

c) $16 \frac{2}{3}$

d) 30

35) A shopkeeper sold an article at the loss of 25 % on Cost Price, the profit /loss percentage on Selling Price is -

a) 20

b) $100/3$

c) $16 \frac{2}{3}$

d) 30

36) Total cost price of two books is 658. If one is sold at 20 % profit and other sold at 15% loss there is no profit no loss in whole transaction. Find the selling price of book which is sold at profit?

a) Rs. 282

b) Rs. 338. 4

c) Rs.376

d) Rs. 319.6

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37) The selling price of an article is $\frac{5}{4}$ of cost price, the profit % is -

- a) 20
- b) 25
- c) 10
- d) 30

38) The selling price of an article is $\frac{3}{4}$ of cost price, the loss % is -

- a) 20
- b) 25
- c) 10
- d) 30

39) The selling price of an article is $\frac{11}{4}$ of cost price; if cost price is 100 then amount of profit is -

- a) 200
- b) 250
- c) 175
- d) 300

40) A man sells one fifth of his goods at 50% profit and the remaining at 10% loss. Find his total profit/loss percentage.

- a) No profit/loss
- b) 5%, profit
- c) 10%, profit
- d) 2%, profit

41) The cost price of two articles is same. One article sold at 10% loss while other sold at 10% profit, the net profit and loss in percentage is -

- a) 1%
- b) 0%
- c) 21
- d) 20

42) On an article the profit is 250% of the cost price. If the cost price increases by 25% but the selling price remains constant, then what is the new profit percentage?

- a) 150
- b) 250
- c) 260
- d) 180

43) A man sells an item for Rs. 2400 at 10% discount. For how much does he need to sell 2 items to gain 5 %?

- a) 5400
- b) 4900
- c) 5200
- d) 5600

44) Rahul sells his half of the products at the rate of 20% discount on marked price and $\frac{1}{4}$ th of the products were sold out 10% on marked price, remaining products were sold out on the marked

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price, in the way he earned a profit of 75% of cost price per product. Find the total number of products.

- a) 25
- b) 30
- c) 10
- d) Cannot be determine

45) The cost of a radio is Rs. 2400. It is sold at two successive discounts one of which is 15%. If the final price is Rs. 1876.8, find the second discount.

- a) 10%
- b) 8%
- c) 6%
- d) 5.5%

46) The difference between the selling prices of an article sold at 4% and 3% profits is 3. Find the cost price of the article.

- a) 400
- b) 350
- c) 300
- d) 100

47) The selling price of two articles is 840. One article sold at 40% profit while other sold at 40% Loss, the total cost price is -

- a) 1000
- b) 2000

c) 1200

d) 1680

48) A shopkeeper bought two articles of a total of RS. 2665. And sold one at a profit of 25% and another at a loss of 20%. If selling price of both the article is same then find difference between the cost prices of both the articles?

- a) 550
- b) 525
- c) 585
- d) 520

49) A shopkeeper sold an article at 5% gain if he had sold it at 3 times the original selling price then profit percentage will be-

- a) 315
- b) 215
- c) 300
- d) 115

50) A shopkeeper sold an article at 20% gain if he had sold it at $\frac{1}{4}$ times the original selling price then loss percentage will be-

- a) 30
- b) 40
- c) 70
- d) 60

Profit and Loss – Answers and Explanation

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1) Answer: C

It is given that cost price (cost price) of 15 articles is equal to the selling price (Selling price) of 20 articles –

$$\Rightarrow 15 \text{ cost price} = 20 \text{ selling price}$$

$$\Rightarrow \text{Selling price/cost price} = 3/4$$

Here cost price is greater than the selling price so there will be loss by selling the articles

$$\text{Loss \%} = (\text{cost price} - \text{selling price} / \text{cost price}) \times 100$$

$$\text{The loss percentage is} = 1/4 \times 100 = 25\%$$

Hence option C is correct.

2) Answer: B

Buy 3 get 2 free will be equal to a discount of 40%

(The shopkeeper will pay for 5 pieces but give away 2 free hence discount%

$$= 2/5 \times 100 = 40\%)$$

Now successive discount formulae if there are two successive discounts of x and y%

$$= -x - y + xy/100$$

$$= -40 - 16.67 + (16.67 \times 40/100) = 50\%$$

3) Answer: A

The dealer actually wants to give 100cm wire but due to expansion ends on giving 140cm wire.

Let us consider 1 cm wire cost him Rs 1, because when customer asks for 100cm wire he gives 140cm due to expansion in gauge. His CP will be RS 140.

But from the customer point of view, will customer give him Rs 140, no because he has asked for 100 cm, he will give the price for 100cm,.

Hence for both the dealer and the customer this will be the agreed price .But dealer needs a profit hence considering this as Cost Price

I.e. he will now set up mark-up % of 60% upon this Price. Hence now he will sell it for Rs 160.

$$\text{Hence profit} = 160 - 140 = \text{Rs } 20.$$

$$\text{Profit \%} = 20/140 \times 100 = 14.28\%$$

4) Answer: C

Let his Cost Price be 100

Then Marked Price = 120

Due to faulty weight his price will be $120 \times 500/300 = 200$.

Upon this he will give 50% discount.

$$\text{Then Selling Price} = 200/2 = 100$$

There is no profit or loss.

5) Answer: C

$$4M + 3P = 113 \text{ ----- (1)}$$

$$7M + 4P = 184 \text{ ----- (2)}$$

Solving (1) & (2)

$$\text{Cost of Marker} = \text{Rs. } 20$$

$$\text{Cost of Pencil} = \text{Rs. } 11$$

Hence 2 markers and 1 pencil cost Rs. 51

6) Answer: C

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Let the person brings 48 candies of first type and 48 candies of 2nd type

Total cost of both the candies = $48/6 + 48/4 = \text{Rs } 20$

But if sells them at 8 per rupee then selling price = $96/8 = 12$

Loss = $20 - 12 = \text{Rs } 8$

But in question loss is Rs 24

Which is 3 times the price hence he must have bought 3 times the quantity of candies.

= $96 \times 3 = 288$

7) Answer: C

Let Cost Price = 100

Profit = 300

Selling Price = 400

New Cost Price = 125

Profit = $400 - 125 = 275$

Required profit % = $275/400 \times 100$

= $275/4 = 68.75$

8) Answer: A

Cost price of 12 pencil = Rs. 60

Number of total boxes = $12/3 = 4$

Selling price of 4 boxes = $18 \times 4 = 72$

Profit percentage = $(72 - 60)/60 \times 100$

= $12/60 \times 100 = 20\%$

9) Answer: A

10 % Cost Price – 8% of Cost Price = 3

2% Cost Price = 3

$2/100$ Cost Price = 3

Cost Price = 150

So SP at 8 % Profit = $108 \times 150/100 = \text{Rs.} 162$

10) Answer: B

Cost Price of a balloon = $2/14 = 1/7$ rs

Selling Price = $140/100 \times 1/7 = 1/5$ Rs

So balloons sold for a rupee = 5

11) Answer: A

120 Cost Price/ $100 = 36$

Cost Price = 30

Selling Price = 33

% profit = $(33 - 30)/30 \times 100$

= $3/30 \times 100 = 10\%$ Profit

12) Answer: B

Making the article number of articles same

	Article	price
Cost price	(12	$15) \times 10 = 150$
Selling price	(10	$14) \times 12 = 168$

Hence cost price = 150 and selling price = 168

Here selling price > cost price so there will be profit on selling the articles

Profit % = $(\text{selling price} - \text{cost price}) / \text{cost price} \times 100$

= $(168 - 150)/150 \times 100 = 12\%$

Hence option B is correct.

13) Answer: B

Total gain percentage = $x + y + xy/100$

Required profit = $11 + 11 + 1.21 = 23.21\%$

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14) Answer: A

$$156(\text{CP} - \text{SP}) = 12 \text{ SP}$$

$$156 \text{ CP} = 168 \text{ SP}$$

$$\text{CP}/\text{SP} = 168/156$$

$$\text{CP}/\text{SP} = 14/13$$

$$\text{Loss} = 1/14 \times 100 = 50/7 = 7 \frac{1}{7}\%$$

15) Answer: C

$$\text{Cost Price} = 100$$

$$\text{Selling Price} = 125$$

$$\begin{aligned} \% \text{ profit when calculated on SP} &= [(125-100)/125] \times 100 \\ &= (25/125) \times 100 = 20\% \end{aligned}$$

16) Answer: B

Let $100x$ be the cost price of article

If it sold at 7 % loss so the selling price₁ will be = $93x$

And it had sold at 9% profit the selling price₂ will be = $109x$

It is given that the difference of both the selling price = 64 rupees

$$\Rightarrow 109x - 93x = 64$$

$$\Rightarrow 16x = 64$$

$$\Rightarrow x = 4$$

So the cost price will be = $100 \times 4 = 400$ rupees

Hence option B is correct.

17) Answer: D

Let Marked Price = X

$$(90/100) * X = 3600$$

$$X = 4000$$

Marked Price = 4000

If the discount was 15%

$$\text{Selling price} = (85/100) * 4000 = 3400$$

18) Answer: C

The cost price of the watch = $59.25/125 \times 100 = 47.4$

Now the cost of 12 watches = $12 \times 47.4 = 568.8$

19) Answer: B

Total cost of plot = 16.5 lakhs + 50 thousand = 17 lakhs

Gain = 4 lakhs

$$\text{Hence profit}\% = 4/17 \times 100 = 23.53\%$$

20) Answer: D

Let $100x$ be the cost price of article

If it sold at 9 % loss so the selling price₁ will be = $91x$

And it had sold at 8% profit the selling price₂ will be = $108x$

It is given that the difference of both the selling price = 51 rupees

$$\Rightarrow 108x - 91x = 51$$

$$\Rightarrow 17x = 51$$

$$\Rightarrow x = 3$$

So the cost price will be = $100 \times 3 = 300$ rupees

If this sold at 25% profit then the selling price = 125% of cost price

$$\text{Selling price} = 125\% \text{ of } 300 = 375$$

Hence option D is correct.

21) Answer: B

Making the article number of articles same

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Article price

Cost price (4 3) $\times 3 = 9$

(3 2) $\times 4 = 8$

Hence total number of articles = 24 and their cost price = 17

Selling price (3 5) $\times 8 = 40$

Hence cost price = 17 and selling price = 40

Here selling price > cost price so there will be profit on selling the articles

Profit % = (selling price - cost price) / cost price $\times 100$
 $= (40 - 17) / 17 \times 100 = 135.29\%$

Hence option B is correct.

22) Answer: B

Profit percentage = (difference of weight / false weight) $\times 100$

$= (1000 - 800) / 800 \times 100$

$= 25\%$

Hence option B is correct.

23) Answer: C

SP of 60 toffees = Rs. 50

SP 1 toffee = $50 / 60 = 5/6$

CP of 1 toffee = $5/6 \times 100/80 = 25/24$

SP When 20 % profit = $25/24 \times 120/100 = 1.25$

So No. of toffees he should sell for Rs. 25 = $25 / 1.25 = 20$

24) Answer: A

CP = 100

SP = $100 + 120 = 220$

If CP increase by 10 % new CP = 110

Profit = $220 - 110 = 110$

Required % = $110 / 220 \times 100 = 50\%$

25) Answer: B

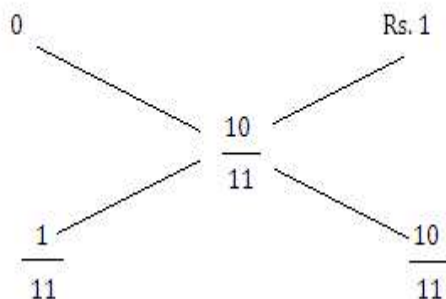
CP of milk = Rs. 1 /liter

SP of 1 liter of mixture = Rs. 1 when profit 10%

C.P of 1 liter mixture = $100 / 110 = \text{Rs. } 10/11$

C.P of 1 litre of water

C.P of 1 litre of milk



Required Ratio = 1 : 10

26) Answer: C

Let the cost price of the article is 100x

If this article is sold at 50% profit so the selling price1 = 150x

If the same article is purchased at 20% less so the cost price will be = 80x and if this article is sold at 50% profit so the selling price2 = 150% of 80x = 120x

It is given that the difference of both the selling price = 60

$\Rightarrow 150x - 120x = 60$

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$$\Rightarrow 30x = 60$$

$$\Rightarrow x = 2$$

$$100x = 2 \times 100 = 200$$

$$\text{cost price} = 200$$

27) Answer: A

We know that – selling price = $(100 \pm P/L) / 100 \times \text{cost price}$

Let P1 and P2 are the cost prices of both the articles and their selling prices are same therefore-

$$C1 \times 90/100 = C2 \times 120/100$$

$$C1 : C2 = 4:3$$

$$\text{So } C1 = 4/7 \times 2100 = 1200$$

$$C2 = 3/7 \times 2100 = 900$$

Hence option A is correct.

28) Answer: C

$$(16 - 8)\% \text{ of CP} = \text{Rs.} 48$$

$$8/100 \times \text{CP} = 48$$

$$\text{CP} = \text{Rs.} 600$$

29) Answer: B

$$\text{Cost price of 1 banana} = 63/42 = \text{Rs. } 1.5$$

$$9 \text{ dozen banana} = 9 \times 12 = 108 \text{ banana}$$

$$\text{Cost price of 108 banana} = 108 \times 1.5 = 162 \text{ Rs.}$$

30) Answer: A

$$\text{CP} = \text{Rs. } 100$$

$$90/(100) \times \text{MP} = 117$$

$$\text{MP} = 130$$

$$\text{So required \%} = 130 - 100 = 30\%$$

31) Answer: A

$$20\% = 1/5$$

It means if selling price = 5 rupees, then profit = 1 rupees

This profit is calculated on the selling price

$$\text{Hence cost price} = \text{Selling Price} - \text{Profit} = 5 - 1 = 4$$

$$\text{So the actual profit percentage} = \text{profit} / \text{cost price} \times 100$$

$$\Rightarrow 1/4 \times 100 = 25\%$$

Hence option A is correct.

32) Answer: C

$$125 / 100 \text{ MP} = 4625$$

$$\text{Marked Price} = 3700$$

$$\text{Cost Price of mobile for Apurv} = 85/100 \times 3700 = \text{Rs.} 3145$$

33) Answer: A

$$25\% = 1/4$$

It means if cost price = 4 rupees, then profit = 1 rupees

This profit is calculated on the cost price

$$\text{Hence selling price} = \text{Cost Price} + \text{PROFIT} = 4 + 1 = 5$$

$$\text{So the profit percentage on selling price} = \text{profit} / \text{selling price} \times 100$$

$$\Rightarrow 1/5 \times 100 = 20\%$$

Hence option A is correct.

34) Answer: B

$$50\% = 1/2$$

It means if cost price = 2 rupees, then profit = 1 rupees

This profit is calculated on the cost price

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Hence selling price = Cost Price + Profit = $2+1 = 3$

So the profit percentage on selling price = $\text{profit} / \text{selling price} \times 100$

$$\Rightarrow \frac{1}{3} \times 100 = 100/3$$

$$25\% \text{ of profit percentage on selling price} = \frac{1}{4} \times 100/3 = 25/3 = 8.33$$

Hence option B is correct.

35) Answer: B

$$25\% = 1/4$$

It means if cost price = 4 rupees, then loss = 1 rupees

This loss is calculated on the Cost Price

$$\text{Hence selling price} = \text{Cost Price} - \text{loss} = 4 - 1 = 3$$

So the loss percentage on Selling Price = $\text{loss} / \text{selling price} \times 100$

$$\Rightarrow \frac{1}{3} \times 100 = 100/3$$

Hence option B is correct.

36) Answer: B

Profit	loss
+20%	-15%
0%	

$$\frac{15}{3} : \frac{20}{4}$$

$$3 : 4$$

Ratio of CP = 3 : 4

$$\text{So CP of book which is sold at profit} = \frac{3}{7} \times 658 = 282$$

$$\text{SP at } 20\% \text{ profit} = \frac{120}{100} \times 282 = \text{Rs. } 338.4$$

37) Answer: B

$$\text{Selling price} = \frac{5}{4} \text{ cost price}$$

$$\text{Selling price: cost price} = 5:4$$

$$\text{So the profit} = 5 - 4 = 1$$

$$\text{Profit \%} = \frac{1}{4} \times 100 = 25\%$$

Hence option B is correct.

38) Answer: B

$$\text{Selling price} = \frac{3}{4} \text{ cost price}$$

$$\text{Selling price: cost price} = 3:4$$

$$\text{So the loss} = \text{cost price} - \text{selling price} = 4 - 3 = 1$$

$$\text{Loss \%} = \frac{1}{4} \times 100 = 25\%$$

Hence option B is correct.

39) Answer: C

$$\text{Selling price} = 1\frac{1}{4} \text{ cost price}$$

$$\text{Selling price: cost price} = 11:4$$

$$\text{Selling price / cost price} = 11/4 \Rightarrow \text{selling price} / 100 = 11/4$$

$$\text{Selling price} = 11 \times 25 = 275$$

$$\text{So the profit} = \text{selling price} - \text{cost price} = 275 - 100 = 175$$

Hence option C is correct.

40) Answer: D

Let the whole goods be worth x

$$\text{CP of } 1/5 \text{th of goods} = x/5$$

$$\text{SP of } 1/5 \text{th of goods} = 1.5 \times x/5 = 0.3x$$

$$\text{CP of Remaining goods} = 4x/5$$

$$\text{SP of them} = 0.9 \times 4x/5 = 0.72x$$

$$\text{Total SP} = 1.02x$$

$$\text{CP} = 1x$$

$$\text{So, profit} = 2\%$$

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41) Answer: B

Let the cost price of the articles be 100 rupees

The total cost price of both the articles = 200

One sold at 10% loss so the selling price of first article =
90% of 100 = 90 rupee

Another sold at 10 % profit so the selling price of second
article = 110% of 100 = 110

The total selling price of both the articles is = 110+ 90=
200

The total selling price = total cost price

Hence 0% profit

Option B is correct.

42) Answer: D

Let Cost price = x

Profit = 250% of x = 2.5x

Selling price = 3.5x

Increased cost price = 25% of x = 1.25x

Selling price = 3.50x

Profit = 2.25x

Profit % = $(2.25x/1.25) \times 100 = 180\%$

43) Answer: D

Let CP for man be x

SP = 0.9x = 2400

x = 8000/3

For 5% profit, SP = $1.05 \times 8000/3$
= 2800

SP of 2 items = $2800 \times 2 = 5600$

44) Answer: D

There should not be given clear data about cost of price.

So we cannot come to conclusion about the price or
product details.

45) Answer: B

Cost = 2400

For first discount, price = $0.85 \times 2400 = 2040$

Final price = 1876.8

Discount % = $(2040 - 1876.8) \times 100/2040 = 16320/2040$
= 8%

46) Answer: C

Let CP be X

At 4% profit, SP = 1.04x

At 3% profit, SP = 1.03x

Difference = 3

$0.01x = 3$

X = 300

47) Answer: B

The net profit /loss = $(\pm X \pm Y \pm XY/100)$

Here +sign is use for profit, -sign is use for loss

The net profit / loss = $+40 - 40 - (40 \times 40/100) = -16\%$

So the net loss = 16%

We know that selling price = $(100 \pm X)$ cost price/100

\Rightarrow selling price = $(100 - 16)$ cost price/100

$\Rightarrow 1680 = 84 \text{ cost price} / 100$

\Rightarrow cost price = 2000

Hence option B is correct.

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48) Answer: C

Let the cost price of first article is Rs. X

So, Cost price of another article is (2665-X)

According to question,

$$X \times 125\% = (2665 - X) 80\%$$

$$125X = 2665 \times 80 - 80X$$

$$205X = 2665 \times 80 = 1040$$

$$X = 1040$$

So, cost price of another article = $2665 - 1040 = 1625$

$$\text{Required difference} = 1625 - 1040 = 585$$

49) Answer: B

Let the cost price of the article is 100 rupees

So the original selling price = 105% of 100 = 105 rupees

If he sold it at 3 times the original selling price so the new selling price will be

$$\Rightarrow 3 \times 105 = 315 \text{ rupees}$$

So the new profit = $315 - 100 = 215$ rupees

$$\text{New profit \%} = 215/100 \times 100 = 215\%$$

Hence option B is correct.

50) Answer: B

Let the cost price of the article is 100 rupees

So the original selling price = 120% of 100 = 120 rupees

If he sold it at $1/4$ times the original selling price so the new selling price will be

$$\Rightarrow 1/4 \times 120 = 30 \text{ rupees}$$

So the loss = $100 - 30 = 70$ rupees

$$\text{Loss \%} = 70/100 \times 100 = 70\%$$

Hence option C is correct.

Mixture and Alligation

1. X and Y two alloys are made by mixing aluminum and magnesium metals in the ratio of 8: 5 and 9:16 respectively. If equal amounts of alloys are melted to form a new alloy Z, what will be the ratio of aluminum and magnesium in Z?

a) 317:333

b) 316:319

c) 314:333

d) 313:317

2. In a glass of syrup, water and sugar are mixed in the ratio 3: 2. If 8 liters of the mixture is replaced by 12 liters of sugar liquid, then the ratio of water and sugar becomes 1: 2. How many liters of water was in the glass?

a) 4.6

b) 13.8

c) 31.8

d) 12.8

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3. How many kilograms of sugar of Rs.5.4 per kg should be mixed with 10 kg of sugar of Rs.4.5 per kg, such that there may be gain of 20% by selling the mixture at Rs.5.94 per kg.
- a) 10 kg
 - b) 12 kg
 - c) 15 kg
 - d) 8 kg
4. A and B pulses of different quality, priced at Rs 70 per kg and Rs 130 per kg respectively, are mixed. The new average price of the mixture obtained is Rs 100 per kg. What is the ratio of the quantity of A and B in the mixture?
- a) 1:2
 - b) 1:3
 - c) 1:1
 - d) 1:5
5. Silver is 34 times heavier than water and brass is 18 times heavier than water. In what ratio should both the metals be mixed so that they become 24 times heavier than water?
- a) 4:3
 - b) 7:1
 - c) 3:5
 - d) 3:2
6. In what proportion should rice costing Rs. 20 per kg be mixed with another variety of rice costing Rs. 15 per kg, so that the mixed rice obtained has a profit of 20% by selling it at the rate of Rs. 20.40 per kg?
- a) 1:2
 - b) 2:3
 - c) 2:5
 - d) 1:6
7. In a milk water mixture $\frac{2}{3}$ part is milk. The total volume of the mixture is 42 liters. If 8 liters of water is added to it, what will be the percentage of milk in the mixture?
- a) 55
 - b) 56
 - c) 54
 - d) 50
8. The ratio of Alcohol and water in two pots is 2 : 5 and 4 : 3, find the ratio of alcohol and water in the new mixture obtained (in the third new vessel) after mixing the mixture of the two pots.
- a) 3 : 1
 - b) 7 : 9
 - c) 3 : 4
 - d) 1 : 3

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9. A mixture of 10 liters of sugar contains 11% sugar, out of which 2 liter of water becomes steam. Find the percentage of sugar in the remaining mixture.
- a) 15%
 - b) 13.75%
 - c) 16%
 - d) 24%
10. In what ratio should 30% milk solution be mixed with 60% milk solution so that the resulting solution contains 40% milk?
- a) 12 : 13
 - b) 13 : 12
 - c) 2 : 1
 - d) 3 : 5
11. The mixture of alcohol and water in two pots, P and Q, is in the ratio 4: 5 and 3: 2. In what proportion can these two mixtures be mixed to obtain a new mixture of half alcohol and half water?
- a) 1 : 2
 - b) 9 : 5
 - c) 3 : 4
 - d) 3 : 7
12. The 30 liter beer contains 5% alcohol. How many liters of water should be added to the beer so that the alcohol content becomes 3%?
- a) 20 liter
 - b) 15 liter
 - c) 10 liter
 - d) 25 liter
13. A drum of beer has water and alcohol in the ratio 7:5. If 9 liters of the mixture is replaced by 10 liters of alcohol, then the ratio of water and alcohol becomes 7:9. How many liters of water was in the drum?
- a) 12
 - b) 22.75
 - c) 33
 - d) 22
14. A pot of honey extracted from the jungles of Kolkata contains 40% carbohydrates. Part of it is replaced by other honey, which has 19% carbohydrate, then the new mixture has 26% carbohydrate. How much honey was replaced?
- a) $\frac{2}{3}$
 - b) $\frac{4}{5}$
 - c) $\frac{3}{5}$
 - d) $\frac{4}{3}$
15. At the Heineken Beer Company four drums of similar size are filled with beer. The alcohol content in the four drums is 80% 75%, 60% and 50% respectively. If all four mixtures are

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mixed, what will be the ratio of water and alcohol in the mixture obtained?

- a) 3 : 7
- b) 27 : 53
- c) 13 : 15
- d) 9 : 13

16. From a drum containing 50 liters of pure honey from Patanjali, 10 liters of honey are extracted and 10 liters of preservatives are added. If this process is repeated three times, what is the ratio between ultimately preservative and honey?

- a) 16 : 17
- b) 18 : 19
- c) 61 : 64
- d) 11 : 12

17. How many liters of preservatives should be added to a 16 liter cough syrup with 10% preservatives, so that the amount of preservatives in the mixture is 20%?

- a) 2 liters
- b) 1.5 liters
- c) 3 liters
- d) 2.5 liters

18. The initial ratio of maida and flour to saltpeter was 17:28. How much flour is added to the

raw material of 27 kg saltpeter so that ratio of maida and flour become 2:5?

- a) 7.5 kg
- b) 8.7 kg
- c) 7.3 kg
- d) 9.1 kg

19. Three varieties of almonds Rs.25200 per quintal, Rs.28000 per quintal and Rs.31600 per quintal is sold. What will be the profit or loss on selling 274 kg of the first variety, 197 kg of the second variety and 54 kg of the third variety at the rate of Rs.28350 per quintal?

- a) Profit of Rs.7565.50
- b) Loss of Rs.6765.50
- c) Profit of Rs.5832.40
- d) Loss of Rs.7125.30

20. Preservatives of Rs. 225 per kg and Rs. 275 per kg are used to protect syrup. In what proportion should both preservatives be mixed so that the mixture obtained becomes Rs. 253.4 per kg (approx).

- a) 4 : 3
- b) 1 : 2
- c) 7 : 3
- d) 3 : 4

21. In what proportion should buffalo milk costing Rs. 40 per kg be mixed with cow's milk

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at Rs. 30 per kg, so that there is a profit of 20% on selling the mixture at the rate of Rs. 40.8 per kg.

- a) 3 : 2
- b) 2 : 3
- c) 12 : 15
- d) 11 : 16

22. In what ratio should Rs. 50 per kg and Rs. 60 per kg of sugar be mixed so that 20% profit is made by selling the mixture at Rs. 70 per kg?

- a) 12 : 13
- b) 12 : 15
- c) 1 : 5
- d) 1 : 4

23. Two types of tea, priced at Rs.380 per kg and Rs.420 per kg, are mixed in the same quantity. And are sold at a rate of Rs.450 per kg. Find the percentage profit.

- a) 11%
- b) 12.5%
- c) 13%
- d) 14.5%

24. What is the amount of egg in a 1 kg cake, if the cake contains 32% egg, 40% flour and the rest sugar?

- a) 370 gm
- b) 340 gm

c) 410 gm

d) 320 gm

25. Cow and buffalo milk, which are priced at Rs.25 and Rs.35 per kg respectively, mixed in ratio of 4:6 and selling at the rate of Rs.37 per kg, the profit percentage will be approximately?

- a) 20%
- b) 33%
- c) 25%
- d) 38%

26. To get 25% profit on milk at the rate of Rs. 30 per kg, in what proportion will the milk of cow and buffalo have to be mixed, if there is a loss of 20% on selling cow's milk at Rs.16 per kg and Rs. 40 per kilogram of buffalo milk has a profit of 20%?

- a) 4:5
- b) 3:2
- c) 2:1
- d) 1:2

27. The ratio of water and alcohol in one drum of wine is 4:3 and in the other drum the ratio is 3:2. What will be the ratio of water and alcohol when both are mixed in the ratio of 1: 2 respectively?

- a) 42:41

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- b) 62:43
c) 48:57
d) 39:48
28. In what ratio should Rs. 35 per kg of cow's milk and Rs. 65 per kg of buffalo milk be mixed so that the new price of the mixture becomes Rs. 50 per kg?
- a) 3:4
b) 2:3
c) 1:1
d) 1:3
29. In what proportion should the two liquor drums, where alcohol and water are in the ratio of 3:1 and 5:3 respectively, be mixed so that in mixture ratio of alcohol and water is 2:1?
- a) 1:2
b) 2:1
c) 2:3
d) 3:2
30. The two drums of Ruhafaza have sugar and water in the ratio of 5: 3 and 7: 9 respectively. What will be the new ratio of sugar and water when these two drums are mixed?
- a) 17:15
b) 15:17
c) 13:17
d) 17:13
31. A mixture of diesel and petrol contains 80% diesel. If 18 litres of petrol is added to the mixture, then the quantity of petrol in the mixture becomes half the quantity of diesel in the resultant mixture. Find the initial quantity of mixture.
- a) 80 litres
b) 90 litres
c) 120 litres
d) None of these
32. A mixture of milk and water is mixed in the ratio of 4:3, respectively. If 4 litres of water is added to the mixture, then the ratio of milk to water becomes 6:5, respectively. Find the initial quantity of milk in the mixture.
- a) 40 litres
b) 48 litres
c) 44 litres
d) 36 litres
33. The percentage of milk in a mixture of 60 litres containing water and milk is 75%. Find the amount of water to be mixed in the mixture such that the percentage of milk is reduced to 50%.
- a) 35 litres
b) 25 litres

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- c) 20 litres
d) 30 litres
34. A mixture of milk and water contains 'x'% of water. If the quantity of milk in the mixture is 16 litres more than the quantity of water and the total mixture is 80 litres, then find the value of 'x'.
- a) 40%
b) 33.33%
c) 50%
d) 25%
35. Water and alcohol are mixed in an empty container in the ratio of 7:2, respectively. If 45 ml of mixture is replaced with 15 ml of water then, the ratio of water to alcohol becomes 4:1, respectively. Find the amount of water mixed initially.
- a) 140 ml
b) 210 ml
c) 70 ml
d) 105 ml
36. A mixture of milk and water contains 45% water. If the total cost of milk present in the mixture at the rate of Rs. 21/litre is Rs. 2079, then find the additional amount of water to be used in the mixture such that quantity of milk and water becomes same.
- a) 16 litres
b) 18 litres
c) 19 litres
d) 21 litres
37. A container contains 96 litres of mixture of water and milk in the ratio 3:5, respectively. If a person adds 4 litres of water in the mixture, then what will be the ratio of milk to water in the final mixture?
- a) 3:2
b) 4:3
c) 5:4
d) 2:1
38. A vessel contains mixture of milk and water mixed in the ratio 13:5, respectively. 72 liters of the mixture is taken out of the vessel and replaced with 51 liters of water such that the ratio of the milk to water in the vessel becomes 8:7, respectively, then find the initial quantity of water in the vessel.
- a) 50 liters
b) 55 liters
c) 60 liters
d) None of these
39. In a container, the ratio of milk and water is 4:3. If a milkman adds 7 litres of milk into it then the ratio would change to 5:2. Calculate

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the amount of water present in the final mixture.

- a) 6 litres
- b) 4 litres
- c) 8 litres
- d) 5 litres

40. A mixture of diesel and petrol contains 80% petrol. If 25 litres of diesel is added to the mixture, the quantity of diesel in the resultant mixture becomes 40 litres, find the quantity of petrol initially.

- a) 54 litres
- b) 60 litres
- c) 72 litres
- d) 80 litres

41. In a container, the respective ratio of milk to water is 4:3. If milkman adds 4 litres of water to it, then the ratio of milk to water would change to 6:5, respectively. Find the initial quantity of mixture in the container.

- a) 70 litres
- b) 91 litres
- c) 77 litres
- d) 84 litres

42. A mixture of milk and water, contains milk and water in the ratio of 7: 6, respectively. If 6 litres of water is added to the mixture, then the

quantity of water and milk in the resultant mixture becomes same. Find the initial quantity of mixture.

- a) 84 litres
- b) 72 litres
- c) 78 litres
- d) None of these

43. 360 litres of a mixture contains milk and water in the ratio of 5:3 respectively. After addition of some litres of water to it, the quantity milk becomes equal to the quantity of water in the resultant mixture, then find the amount of water added to the initial mixture to form the resultant mixture.

- a) 45 litres
- b) 60 litres
- c) 75 litres
- d) 90 litres

44. The price of the three varieties of rice, rice 1, rice 2 and rice 3 is Rs. 44/kg, Rs. 48/kg and Rs. 60/kg, respectively. If the ratio in which the quantity of rice 1, rice 2 and rice 3 is mixed to form a mixture is 5:3:2, respectively, then find the price per kg of the mixture.

- a) Rs. 47.60
- b) Rs. 49.20
- c) Rs. 48.40

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- d) None of these
45. Container P contains a mixture of liquid A and liquid B in the ratio of 5:4 respectively. 25% of this mixture is taken out and mixed with a mixture of the same liquids in container Q. The quantity of mixture in container Q initially is 12 litres with the ratio of quantity of liquid A to quantity of liquid B i.e. 2:1, respectively. If the quantity of liquid B in the resultant mixture is 7 litres in container Q, then what was the quantity of liquid A initially in container P?
- a) 15 litres
 - b) 18 litres
 - c) 20 litres
 - d) 10 litres
46. A vessel contains mixture of milk and water, mixed in the ratio 11:5 respectively. 64 liters of mixture is taken out of the vessel and replaced by 9 liters of water so that the ratio of the milk to water in the vessel becomes 7:4. Find the initial quantity of mixture in the vessel.
- a) 224 liters
 - b) 208 liters
 - c) 176 liters
 - d) 160 liters
47. A vessel contains some quantity of mixture of milk and water in the ratio of 5:4, respectively. If 20% of the mixture is taken out and then 4 litres of water is added to the mixture so that the quantity of water becomes equal to the quantity of milk in the mixture, then find the initial quantity of the mixture.
- a) 42 litres
 - b) 36 litres
 - c) 45 litres
 - d) 54 litres
48. The ratio quantity of liquid A to liquid B in container P is 2:5, respectively and the ratio of quantity of liquid A to liquid B in container Q is 3:4 respectively. The contents of both containers are now mixed in a new container R which was initially empty. If the ratio of quantity of liquid A to liquid B in the new container R is 2:3, then find the ratio of liquid A present initially in container P to container Q.
- a) 2:1
 - b) 2:3
 - c) 1:6
 - d) 3:2
49. Solution X contains 20% acid and solution Y contains 60% acid. In what ratio should

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solution X be mixed with Solution Y to obtain a mixture with 50% acid?

- a) 1 : 2
- b) 3 : 1
- c) 1 : 3
- d) 2 : 1

50. In what ratio should coffee powder costing Rs.2000/kg be mixed with coffee powder

costing Rs 1000/kg so that the cost of the mixture is Rs.1250/kg?

- a) 1 : 4
- b) 4 : 1
- c) 3 : 1
- d) 1 : 3

Mixture and Alligation – Answers and Explanation

1) Answer: A

The ratio of aluminum and magnesium in Z

$$= [8/13+9/25] : [5/13+16/25] = 317/325 : 333/325 = 317:333$$

2) Answer: B

According to first condition,

Suppose, water and sugar are 3x liter and 2x liter respectively.

Remaining total mixture after removal of 8 liter = (5x-8) liter

The amount of water in this mixture = $(5x-8) \times \frac{3}{5} = ((15x-24)/5)$ liter

And quantity of sugar = $(5x-8) \times \frac{2}{5}$

Quantity of sugar after adding 12 liter sugar = $(5x-8) \times \frac{2}{5} + 12 = ((10x-16))/5 + 12$
 $= (10x-16+60)/5 = (10x+44)/5$

According to second condition -

$$((15x-24)/5) : (10x+44)/5 = 1/2$$

$$\Rightarrow 2(15x-24) = (10x+44)$$

$$30x-48 = 10x+44$$

$$44+48 = 30x-10x$$

$$92 = 20x$$

$$x = 4.6$$

So, Amount of water = $3x = 3 \times 4.6 = 13.8$ liter

3) Answer: A

Let, the amount of rice of Rs.5.4 per kg = x kg

According to the question,

$$x \times 5.4 + 4.5 \times 10 = 5.94 \times (10+x) \div 120 \times 100$$

$$5.4x + 45 = 4.95 \times (10+x)$$

$$5.4x + 45 = 49.5 + 4.95x$$

$$5.4x - 4.95x = 49.5 - 45$$

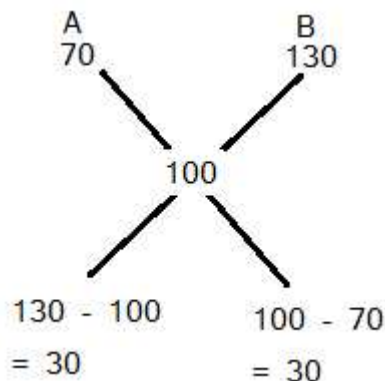
$$0.45x = 4.5$$

$$x = 10 \text{ kg}$$

4) Answer: C

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According to Question -

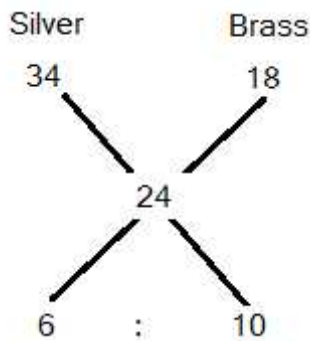


(Quantity of A / Quantity of B) = 30/30

Ratio = 1:1

5) Answer: C

According to Question -



That is, both metals have to be mixed in the ratio 3:5.

6) Answer: B

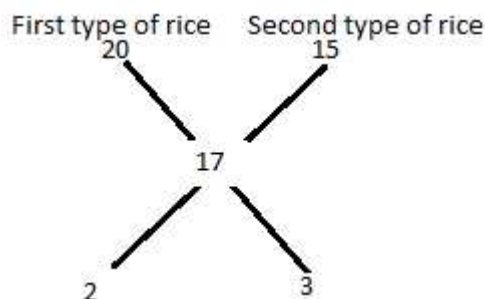
Sale price of new rice = 20.40 Rupees per kg, and profit = 20%

Hence the purchase price per kg of new rice = Sale price / (100 + profit %) × 100

$$= 20.4 / (100 + 20) \times 100 = 20.4 / 120 \times 100$$

= 17 Rupees per kg

Now by Allegation method -



Intended ratio = 2:3

7) Answer: B

Amount of milk in the mixture = $\frac{2}{3} \times 42$ liters

And the amount of milk = 28 liters

According to Question,

The total mixture after mixing the amount of water =

$$42 + 8 = 50 \text{ liters}$$

Percent of milk = quantity of milk / volume of total mixture × 100 liters

$$\text{Percent of milk} = \frac{28}{50} \times 100 \text{ liters}$$

Milk percentage = 56%

8) Answer: C

Intended ratio = $(\frac{2}{7} + \frac{4}{7}) : (\frac{5}{7} + \frac{3}{7})$

$$= \frac{6}{7} : \frac{8}{7} = 6 : 8 = 3 : 4$$

9) Answer: B

$$\text{Sugar content} = \frac{10 \times 11}{100} = 1.1$$

Remaining mixture = 8 liters

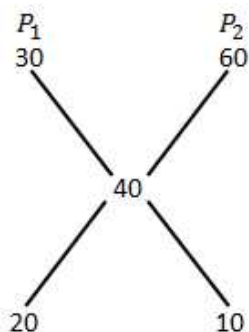
The percentage of sugar in the remaining mixture =

$$(\frac{1.1}{8}) \times 100 = 13.75\%$$

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10) Answer: C

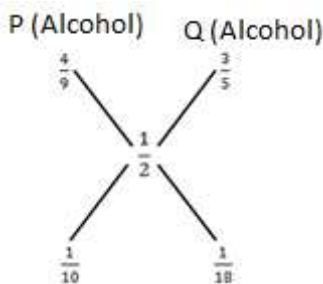
According to Question-



Intended ratio = $20 : 10 = 2 : 1$

11) Answer: B

According to Question -



Intended ratio = $(1/10) : (1/18) = 9:5$

12) Answer: A

Alcohol content in 30 liters of beer = $30 \times (5/100) = (3/2) = 1.5$ liter

Suppose the amount of water added = x liter

By question -

$$(30 + x) \times 3/100 = 1.5$$

$$30 + x = 50 \Rightarrow x = 20 \text{ liter}$$

13) Answer: B

Suppose water and alcohol in a drum is $7x$ and $5x$ respectively.

Remaining total mixture after removing 9 liters = $(12x - 9)$ liters

Quantity of water in this mixture = $(12x - 9) \times 7/12 = ((28x - 21)/4)$ liter

And the amount of alcohol = $(12x - 9) \times 5/12$

The amount of alcohol in the mixture again on filling 10 liters of alcohol

$$= (12x - 9) \times 5/12 + 10 = (60x - 45)/12 + 10 = (60x - 45 + 120)/12 = (60x + 75)/12 = ((20x + 25)/4)$$

According to second condition -

$$\therefore ((28x - 21)/4) \times 4/(20x + 25) = 7/9$$

$$\Rightarrow 7(20x + 25) = 9(28x - 21)$$

$$140x + 175 = 252x - 189$$

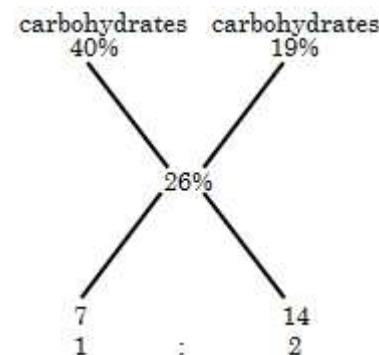
$$175 + 189 = 252x - 140x$$

$$364 = 112x$$

$$(x = 3.25)$$

$$(\text{Water} = 7x = 7 \times 3.25 = 22.75) \text{ Liter}$$

14) Answer: A



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Honey content = $\frac{2}{3}$

15) Answer: B

	I	II	III	IV
(A) Alcohol →	80	75	60	50
(W) Water →	20	25	40	50
A:W	A:W	A:W	A:W	A:W
I = 80:20	II = 75:25	III = 60:40	IV = 50:50	
= 4:1	= 3:1	= 3:2	= 1:1	

According to Question,

$$A:W = (4/5 + 3/4 + 3/5 + 1/2) : (1/5 + 1/4 + 2/5 + 1/2)$$

$$\therefore A:W = ((16+15+12+10)/20) : ((5+4+8+10)/20)$$

$$= 53:27$$

$$\text{Or, } W:A = 27:53$$

16) Answer: C

$$\text{Amount of pure honey in the drum} = 50 \left(1 - \frac{10}{50}\right)^3$$

$$= 50 \left(1 - \frac{1}{5}\right)^3$$

$$= 50 \times (4/5) \times (4/5) \times (4/5) = 128/5 \text{ Liter}$$

$$\text{Quantity of preservatives} = 50 - 128/5$$

$$= (250 - 128)/5 = 122/5$$

$$\text{Preservative: Honey} = 122/5 : 128/5$$

$$= 61:64$$

17) Answer: A

Let x liters preservative be added

The amount of syrup in the beginning = The quantity of syrup in the end

$$16 \times 90 = (16 + x) \times 80$$

$$144 = 128 + 8x$$

$$144 - 128 = 8x$$

$$16 = 8x$$

$$x = 2 \text{ Liter}$$

18) Answer: B

$$\text{Total quantity of raw material} = 27 \text{ Kg}$$

$$\text{Maida and Flour Ratio} = 17:28$$

$$\therefore \text{Quantity of maida} =$$

$$(17 \times 27) / (17 + 28) = (17 \times 27) / 45 = 51/5 \text{ kg}$$

$$\therefore \text{Quantity of flour} =$$

$$(28 \times 27) / (17 + 28) = (28 \times 27) / 45 = 84/5 \text{ kg}$$

Suppose if (x) kg of flour is added to it,

$$\frac{\frac{51}{5}}{\frac{84}{5} + x} = \frac{2}{5}$$

$$= 51 / (84 + 5x) = 2/5$$

$$\Rightarrow 168 + 10x = 255$$

$$\Rightarrow 10x = 255 - 168 = 87$$

$$\text{Or, } x = 8.7 \text{ kg}$$

19) Answer: A

$$\text{Total price of all three types of almonds}$$

$$= 252 \times 274 + 280 \times 197 + 316 \times 54$$

$$= 69048 + 55160 + 17064 = \text{Rs. } 141272$$

$$\text{Total value of mixture} = (274 + 197 + 54) \times 283.50$$

$$= 525 \times 283.50$$

$$= \text{Rs. } 148837.5$$

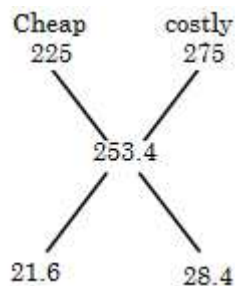
$$\text{Thus, the total profit on sales} = 148837.5 - 141272 =$$

$$\text{Rs. } 7565.50$$

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20) Answer: D

According to Question -



Cheap : costly = 21.6 : 28.4

$$= 216/284 = 54/71$$

$$\approx 54/72 = 3/4$$

Cheap: costly = 3 : 4

21) Answer: B

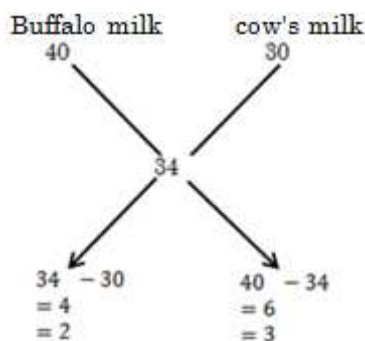
Sale price of the mixture = Rs. 40.8 per kg and profit = 20%

Hence the cost price per kg of the mixture = selling price / (100 + profit %) × 100

$$= 40.8 / (100 + 20) \times 100 = 40.8 / 120 \times 100$$

$$= 34 \text{ rupees per kg}$$

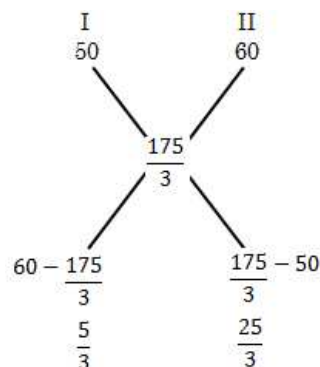
Now By allegation method-



Intended ratio = 2 : 3

22) Answer: C

According to Question



$$I : II = 1 : 5$$

23) Answer: B

Price of first type of tea = Rs.380/kg

Price of second type of tea = 420/kg

Cost price of both types of tea = (380 + 420) = Rs.800

Sale price of both types of tea = 450 × 2 = Rs.900

Profit = selling price - Cost price

$$= 900 - 800 = 100$$

Profit % = profit/cost price × 100

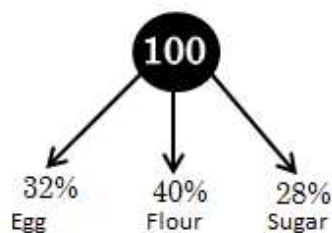
$$= 100/800 \times 100 = 12.5\%$$

24) Answer: D

Cake = 1 kg = 1000

Total cake = 100%

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Egg content = $1000 \times 32/100 = 320$ gm

25) Answer: A

Cost price of cow's milk = $25 \times 4 = 100$

Cost price of buffalo's milk = $35 \times 6 = 210$

Total purchase price = Rs.310

Total selling price = $37 \times 10 =$ Rs.370

In question -

selling price = (Cost price (100+P/L))/100

$\Rightarrow 370 = (310 \times (100+P\%))/100$

$3700 - 3100 = P\% \times 310$

$600/31 = P\%$

$P\% = 19.35\%$

$P\% = 20\%$ (Approx)

26) Answer: C

Suppose cow's milk is x part and buffalo milk is y part.

According to Question,

$(16x+40y)/(x+y) \times 125/100 = 30$

$(16x+40y)/(x+y) \times 5/4 = 30$

$16x+40y = 24(x+y)$

$(24-16)x = (40-24)y$

$8x = 16y$

$x = 2y,$

$x/y = 2/1$

$x:y = 2:1$

27) Answer: B

Volume of water in first drum = $4/7$

And the quantity of alcohol = $3/7$

Volume of water in second drum = $3/5$

And the amount of alcohol = $2/5$

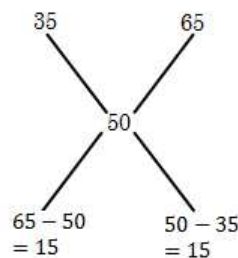
According to the question, by mixing the two mixtures in the ratio 1:2

$$\Rightarrow \frac{\frac{4}{7} \times 1 + \frac{3}{5} \times 2}{\frac{3}{7} \times 1 + \frac{2}{5} \times 2} = \frac{\frac{4}{7} + \frac{6}{5}}{\frac{3}{7} + \frac{4}{5}} = \frac{20+42}{15+28} = \frac{62}{43}$$

Desired ratio = 62:43

28) Answer: C

According to Question -



Cow's milk / buffalo milk = 15/15

Ratio = 1:1

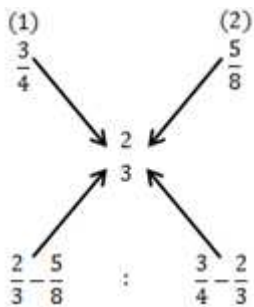
29) Answer: A

Alcohol in the first drum = $3 / (1 + 3) = 3/4$

Alcohol in another drum = $5 / (3 + 5) = 5/8$

Alcohol in new mixture = $2 / (1 + 2) = 2/3$

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$$= 1/24 : 1/12 = (1:2)$$

30) Answer: A

New ratio of sugar and water =

$$[5/8 + 7/16] : [3/8 + 9/16] = 17/16 : 15/16 = 17:15$$

31) Answer: B

Let the initial quantity of mixture be 'x' litres.

Initial quantity of diesel = 0.8x litres

Initial quantity of petrol = 0.2x litres

According to question,

$$2(0.2x + 18) = 0.8x$$

$$0.4x + 36 = 0.8x$$

$$0.4x = 36, x = 90 \text{ litres}$$

So, the initial quantity of mixture = 90 litres

32) Answer: B

Let the initial quantity of milk and water be 4x litres and 3x litres respectively.

According to question,

$$4x / (3x + 4) = 6/5$$

$$20x = 18x + 24$$

$$2x = 24, x = 12$$

So, the initial quantity of milk in the mixture = 4x = 48 litres

33) Answer: D

Quantity of milk initially = 75% of 60 = 45 litres

Quantity of water initially = 60 - 45 = 15 litres

Let the quantity of water added be 'x'.

$$45 = 50\% \text{ of } (60 + x)$$

$$90 = 60 + x$$

$$x = 30 \text{ litres}$$

34) Answer: A

According to question,

$$(100 - x)\% \text{ of } 80 - x\% \text{ of } 80 = 16$$

$$(100 - 2x)\% \text{ of } 80 = 16$$

$$100 - 2x = 20$$

$$2x = 80, x = 40$$

So, the value of 'x' = 40%

35) Answer: A

Let, amount of water and alcohol mixed initially be '7x' ml and '2x' ml, respectively.

$$\text{So, } (7x - 35 + 15) / (2x - 10) = 4/1$$

$$7x - 20 = 8x - 40$$

$$x = 20$$

So, the amount of water mixed initially = 7x = 140 ml

36) Answer: B

Quantity of milk in the mixture initially = 2079/21 = 99 litres

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Quantity of water in the mixture initially = $(99/0.55)$

$$\times 0.45 = 81 \text{ litres}$$

Let the additional amount of water used be 'x'.

$$x + 81 = 99$$

$$x = 18 \text{ litres}$$

37) Answer: A

$$\text{Quantity of water initially} = 96 \times 3/8 = 36 \text{ litres}$$

$$\text{Quantity of milk initially} = 96 \times 5/8 = 60 \text{ litres}$$

$$\text{Final ratio} = 60: (36 + 4) = 60:40 = 3:2$$

38) Answer: C

Let the initial quantities of milk and water in the vessel be '13x' liters and '5x' liters, respectively.

$$\text{Quantity of milk taken out} = (13/18) \times 72 = 52 \text{ liters}$$

$$\text{Quantity of water taken out} = 72 - 52 = 20 \text{ liters}$$

According to question,

$$(13x - 52)/(5x - 20 + 51) = 8/7$$

$$91x - 364 = 40x + 248$$

$$51x = 612$$

$$x = 12$$

$$\text{So, the initial quantity of water in the vessel} = 12 \times 5 = 60 \text{ liters}$$

39) Answer: A

Let the initial quantity of milk and water be 4x and 3x respectively

$$\frac{4x + 7}{3x} = \frac{5}{2}$$

$$8x + 14 = 15x$$

$$7x = 14$$

$$x = 2$$

Amount of water in the initial and final mixture is same i.e. $3x = 6$ liters

40) Answer: B

Let the quantity of mixture initially be 'x' litres.

According to question,

$$0.2x + 25 = 40$$

$$0.2x = 15, x = 75$$

So, the quantity of petrol initially = 80% of 75 = 60 litres

41) Answer: D

Let the initial quantity of milk and water be 4x litres and 3x litres, respectively.

$$4x/(3x + 4) = 6/5$$

$$20x = 18x + 24$$

$$2x = 24, x = 12$$

Required initial quantity of mixture in the container =

$$7x = 84 \text{ litres}$$

42) Answer: C

Let the initial quantity of milk and water be 7x and 6x litres, respectively.

$$\text{So, } 7x = 6x + 6$$

$$x = 6$$

So, required initial quantity of mixture = $13x = 78$ litres

43) Answer: D

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Let the amount of water added be 'x' litres.

Amount of milk in mixture initially = $(5/8) \times 360 = 225$ litres

Amount of water in mixture initially = $(3/8) \times 360 = 135$ litres

According to question,

$$225 = 135 + x$$

$$x = 225 - 135$$

$$x = 90 \text{ litres}$$

44) Answer: C

Let the quantity of rice 1, rice 2 and rice 3 mixed be '5x', '3x' and '2x' kg, respectively.

$$\text{Price per kg of the mixture} = (44 \times 5x + 48 \times 3x + 60 \times 2x) / (5x + 3x + 2x) = \text{Rs. } 48.40$$

45) Answer: A

Let the quantity of liquid A and liquid B initially in container P be '5x' litres and '4x' litres respectively.

$$\text{Quantity of liquid A in container Q initially} = (2/3) \times 12 = 8 \text{ litres}$$

$$\text{Quantity of liquid B in container Q initially} = 12 - 8 = 4 \text{ litres}$$

Quantity of liquid B in the resultant mixture in container Q = 7 litres

$$0.25 \times 4x + 4 = 7$$

$$x + 4 = 7$$

$$x = 3$$

So, quantity of liquid A in container P initially = $5x = 15$ litres

46) Answer: C

Let the initial quantities of milk and water in the vessel be $11x$ liters and $5x$ liters respectively.

When 64 liters mixture is taken out,

$$\text{Quantity of milk taken out} = (11x/16x) \times 64 = 44 \text{ liters}$$

$$\text{Quantity of water taken out} = 64 - 44 = 20 \text{ liters}$$

According to question,

$$(11x - 44)/(5x - 20 + 9) = 7/4$$

$$44x - 176 = 35x - 77$$

$$9x = 99$$

$$x = 11$$

$$\text{So, the initial quantity of mixture in the vessel} = 16x = 16 \times 11 = 176 \text{ liters}$$

47) Answer: C

Let the quantity of milk and water in the mixture be '5x' litres and '4x' litres, respectively.

According to question,

$$0.8 \times 5x = 0.8 \times 4x + 4$$

$$4x = 3.2x + 4$$

$$0.8x = 4$$

$$x = 5$$

$$\text{Initial quantity of mixture} = 5x + 4x = 9x = 9 \times 5 = 45 \text{ litres}$$

48) Answer: C

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Let the amount of liquid A and liquid B in container P be '2x' litres and '5x' litres, respectively.

And, let the amount of liquid A and liquid B in container Q be '3y' litres and '4y' litres, respectively.

In container R,

Amount of liquid A = $2x + 3y$

Amount of liquid B = $5x + 4y$

According to question,

$$(2x + 3y)/(5x + 4y) = 2/3$$

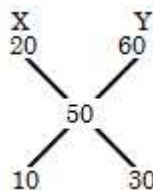
$$3(2x + 3y) = 2(5x + 4y)$$

$$6x + 9y = 10x + 8y$$

$$y = 4x$$

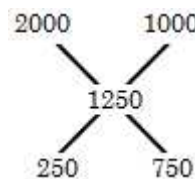
$$\text{So, required ratio} = 2x : 3y = 2x : 12x = 1:6$$

49) Answer: C



$$X : Y = 1 : 3$$

50) Answer: D



$$= 1 : 3$$

Decimals and Fractions

1) Find the largest fraction among the following.

$1/2, 3/4, 5/6, 6/11, 2/3, 8/9, 6/7$

a) $1/2$

b) $8/9$

c) $3/4$

d) $6/7$

2) After arranging the following ratios in descending order, which will be the last number?

a) 16:21

b) 5:7

c) 2:3

d) 13:14

3) Which of the following fractions is the smallest?

a) $93/15$

b) $83/26$

c) $105/112$

d) $41/17$

4) Arrange the following fractions in descending order.

$11/12, 5/6, 3/7, 8/9, 3/14$

a) $11/12, 8/9, 5/6, 3/7, 3/14$

b) $11/12, 8/9, 3/14, 3/7, 5/6$

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- c) $11/12, 5/6, 8/9, 3/7, 3/14$
d) $11/12, 3/7, 8/9, 5/6, 3/14$
- 5) Which of the following is true for the given numbers?
a) $9/29 < 13/33 < 32/47 < 20/47$
b) $9/29 < 13/33 < 20/47 < 32/27$
c) $9/29 < 13/33 < 20/47 < 32/47$
d) $9/29 < 20/47 < 13/33 < 2/47$
- 6) Find the value of $\sqrt{2}$ up to eight digits decimal.
a) 1.41421356
b) 1.41456421
c) 1.41446521
d) 1.41478976
- 7) Which of the following is a terminating decimal?
a) $1/64$
b) $1/24$
c) $1/96$
d) $1/48$
- 8) Which of the following fractions has terminating decimal ?
a) $10/33$
b) $13/66$
c) $10/56$
d) $42/56$
- 9) Which of the following fractions when written as a decimal will not be found in a terminating decimal?
a) $15/40$
b) $8/512$
c) $81/450$
d) $240/450$
- 10) Simplify: $0.6\overline{23}$
a) $623/999$
b) $623/990$
c) $617/990$
d) $6\ 23/990$
- 11) What is the correct expression of $0.06\overline{57}$?
a) $651/9900$
b) $25/297$
c) 859
d) $651/1000$
- 12) Which of these fractions will not result in Recurring decimal?
a) $1/3$
b) $2/5$
c) $7/15$
d) $8/30$
- 13) How can $77/9$ be written in the decimal system?
a) 8.5
b) $8.\overline{5}$

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- c) 8.6
d) 8.75
- 14) Express $444/5\% + 44/5\% + 4/5\% + 0.4/5\%$ as a decimal number.
a) 0.8888
b) 0.9988
c) 0.8966
d) 0.9848
- 15) Which of the following fractions cannot be further simplified?
 $13/169, 27/243, 18/32, 33/43$
a) $33/43$
b) $18/32$
c) $27/243$
d) $13/169$
- 16) How many parts of a day is 3 minutes 36 seconds?
a) $1/200$
b) $1/300$
c) $1/400$
d) $1/500$
- 17) Simplify:
 $8/56 \div 28/35 \div 40/224$
a) 6
b) 5
c) 3
d) 1
- 18) What is the sum of $5/12$ and its inverse?
a) $12/57$
b) $18/93$
c) $120/37$
d) $169/60$
- 19) The sum of a fraction and its inverse is $2\frac{1}{6}$. The larger of the two numbers is-
a) $1\frac{3}{4}$
b) $2\frac{5}{6}$
c) $1\frac{9}{11}$
d) $1\frac{1}{2}$
- 20) The difference between a fraction and its inverse is $3/4$, so what will be the difference between the cubes of both the fraction and its inverse?
a) $123/819$
b) $173/68$
c) $171/64$
d) $189/96$
- 21) Find the fraction which, subtracted from $1/4$, gives the remaining $7/8$?
a) $1/8$
b) $-5/8$
c) $7/8$
d) $-3/8$

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- 22) The sum of two fractions is $11/12$. If one of these fractions is $5/6$, what will be the other fraction?
- a) $1/7$
b) $1/9$
c) $3/23$
d) $1/12$
- 23) Find the value of $12/60 + 13/14 - 19/21 + 31/35 - 23/30$?
- a) $7/15$
b) $3/4$
c) $6/13$
d) $12/35$
- 24) Adding a fraction to $5/8$ makes 9. Find that fraction?
- a) $2/3$
b) $5/8$
c) $8\frac{3}{8}$
d) $9/2$
- 25) In which of the following fractions, adding $1/4$ will give 1?
- a) $11/32$
b) $13/2$
c) $22/32$
d) $6/8$
- 26) If $39 \times 89 = 3471$, then $0.3471 \div 89 = ?$
- a) 0.039
b) 0.39
c) 0.0039
d) 3.9
- 27) Which of the four fractions below is greater than $8/13$ but smaller than $12/17$?
- a) $1/2$
b) $2/3$
c) $7/8$
d) $3/8$
- 28) Which of the following is true?
- a) $10/17 \leq 14/25$
b) $10/17 > 14/25$
c) $10/17 = 14/25$
d) $10/17 < 14/25$
- 29) $1.004 + 1.40004 + 1.3450 - 1.547 = ?$
- a) 2.20204
b) 3.20204
c) 2.20404
d) 2.40204
- 30) Find the smallest of the following decimals.
- a) $0.1 \times 0.1 \times 0.1 \times 0.1$
b) $0.1 \times 0.03/3$
c) $0.1 \times 0.01/2$
d) $0.1 \times 0.1 \times 0.02 \times 0.2$
- 31) Which of the following is true?
- a) $30/7 = 54/13$
b) $30/7 = 44/13$

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- c) $30/7 > 44/13$
d) $30/7 < 44/13$
- 32) If 3 is added to both the numerator and denominator of a fraction, its value becomes $11/12$. If 4 is subtracted from both the numerator and denominator, its value becomes $4/5$. What is the value of that fraction?
- a) $8/9$
b) $6/13$
c) $3/4$
d) $3/5$
- 33) The difference between $4/9$ and another number smaller than that is $1/5$. What is another number?
- a) $4/41$
b) $3/4$
c) $11/45$
d) $9/16$
- 34) $7/12$ of a fraction is equal to $3/4$. Find that fraction?
- a) $3\frac{1}{7}$
b) $1\frac{7}{5}$
c) $1\frac{2}{7}$
d) $1\frac{5}{16}$
- 35) Simplify: $1/(5-2\sqrt{3})$.
- a) $(5 - 2\sqrt{3})/16$
b) $(5+2\sqrt{3})/13$
c) $(5 - 2\sqrt{3})/14$
d) $(5+2\sqrt{3})/12$
- 36) If a rod of $417\frac{3}{5}$ cm length is cut into pieces equal to $23\frac{1}{5}$ cm length, then the total number of pieces obtained will be:
- a) 10
b) 14
c) 16
d) 18
- 37) Roshan, Tanya and Yashi shared a cake among themselves. Roshan had $1/4$ of it, Yashi had $2/3$ of it and the rest was with Tanya. How much of the cake did Tanya have?
- a) $4/7$
b) $1/12$
c) $1/6$
d) $2/6$
- 38) The sum of the numerator and denominator of a fraction is 13. By adding 3 and 9 respectively to the numerator and denominator, the value of the fraction becomes $2/3$. What will be the ratio of the numerator and denominator of the original fraction?
- a) 3:4
b) 5:8

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- c) 12:13
d) 7:6
- 39) Total matches played by a tennis player were 54, in which 36 have been won. Find the number of winning matches as part of total matches in decimal.
a) 0.667
b) 0.87
c) 0.54
d) 0.333
- 40) If $120/150$ is equivalent to $4/x$, then what is the value of x ?
a) 18
b) 6
c) 19
d) 5
- 41) Which of the following ascending order is correct for the given numbers?
a) $2/3, 0.3, 1/4$
b) $0.3, 2/3, 1/4$
c) $1/4, 0.3, 2/3$
d) $2/3, 1/4, 0.3$
- 42) Which of the following options is an example of a recurring decimal?
a) $48/60$
b) $48/90$
c) $48/120$
d) $48/30$
- 43) Find the value of $0.\overline{6}$ in fraction:
a) $1/3$
b) $2/3$
c) $5/3$
d) $4/3$
- 44) Which of the following fractions, when written as a decimal, will be recurring decimal?
a) $162/300$
b) $8/15$
c) $30/96$
d) $21/600$
- 45) Change $207 \div 27$ in mixed fraction.
a) $7 \frac{13}{54}$
b) $7 \frac{8}{9}$
c) $7 \frac{2}{3}$
d) $7 \frac{1}{3}$
- 46) What will be the sum of $11/5$ and its inverse?
a) $146/55$
b) $16/16$
c) $16/55$
d) $110/55$
- 47) If $a + 5/3 = 7/4$, then find the value of a .
a) $1/7$
b) $2/13$
c) $1/12$
d) $1/11$

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48) What will be the difference between $75/36$ and $30/16$?

- a) $11/24$
- b) $7/16$
- c) $10/41$
- d) $5/24$

49) x and y , (corrected to 2 decimal places), are written as 4.57 and 5.42, respectively. What is the upper limit of the value of $x + y$?

- a) 10.000

b) 9.010

c) 8.990

d) 8.995

50) Saina Nehwal has won 54 of 81 matches. Find the number of matches lost as part of total matches in decimal.

a) 0.333

b) 0.066

c) 0.55

d) 0.667

Decimals and Fractions – Answers and Explanation

1) Answer: B

$$1/2 = 0.5$$

$$3/4 = 0.75$$

$$5/6 = 0.83$$

$$6/11 = 0.54$$

$$2/3 = 0.67$$

$$8/9 = 0.89$$

$$6/7 = 0.85$$

$$\text{Largest Fraction} = 0.89 = 8/9$$

2) Answer: C

The given proportional numbers are-

$$13/14 = 39/42$$

$$16/21 = 32/42$$

$$5/7 = 30/42$$

$$2/3 = 28/42$$

Decreasing order of numbers-

$$13/14 > 16/21 > 5/7 > 2/3$$

Hence the last proportional number will be 2:3

3) Answer: C

$$93/15 = 6.2$$

$$83/26 = 3.19$$

$$105/112 = 0.937$$

$$41/17 = 2.411$$

Hence option C is true.

4) Answer: A

$$11/12 = 0.92, 5/6 = 0.83, 3/7 = 0.42, 8/9 = 0.88, 3/14 = 0.21$$

Descending order of fractions - $11/12, 8/9, 5/6, 3/7, 3/14$

5) Answer: C

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$$9/29 = 0.31$$

$$13/33 = 0.39,$$

$$20/47 = 0.42$$

$$32/47 = 0.68,$$

$$0.31 < 0.39 < 0.42 < 0.68$$

$$\text{So, } 9/29 < 13/33 < 20/42 < 32/47$$

6) Answer: A

By taking the square root of 2 by the divide method, the number up to eight digits is 1.41421356.

Thus, option A is correct.

7) Answer: A

$$1/64 = 0.015625$$

$$1/24 = 0.416666667$$

$$1/96 = 0.0104166667$$

$$1/48 = 0.0208333333$$

If the numbers in the quotient obtained by dividing a number do not repeat over and over, we call it a terminating decimal.

$1/64 = 0.015625$ is a terminating decimal.

8) Answer: D

$$\text{a) } 10/33 = 0.3030303$$

$$\text{b) } 13/66 = 0.19696969$$

$$\text{c) } 10/56 = 0.17857142857$$

$$\text{d) } 42/56 = 0.75$$

Hence the value of fraction $42/56$ will not come in recurring decimal.

9) Answer: D

$$\text{a) } 15/40 = 0.375$$

$$\text{b) } 8/512 = 0.015625$$

$$\text{c) } 81/450 = 0.18$$

$$\text{d) } 240/450 = 0.5333... = 0.5\bar{3}$$

The value of the fraction given in option (d) is in recurring decimal. And the remaining three options are examples of terminating decimal.

10) Answer: C

$$= 0.6\bar{23}$$

$$= (623 - 6)/990$$

$$= 617/990$$

11) Answer: A

$$0.06\bar{57} = (657 - 6)/9900 = 651/9900$$

12) Answer: B

From options,

$$\text{a) } \frac{1}{3} = 0.\bar{3}$$

$$\text{b) } \frac{2}{5} = 0.4$$

$$\text{c) } \frac{7}{15} = 0.4\bar{6}$$

$$\text{d) } \frac{8}{30} = \frac{4}{15} = 0.2\bar{6}$$

Hence option b is not in recurring decimal.

13) Answer: B

$$77/9 = 8.\bar{5}$$

14) Answer: D

$$444/5\% + 44/5\% + 4/5\% + 0.4/5\%$$

$$= 492/5\% + 0.4/5\%$$

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$$= 492.4/5\%$$

$$= 492.4/500 = 0.9848$$

15) Answer: A

33/43 cannot be simplified further because 43 is prime.

16) Answer: C

Number of hours in 1 day = 24

Number of seconds in 1 day = $24 \times 60 \times 60$ second

$$3\text{minute}36\text{second} = (3 \times 60 + 36) \text{ seconds}$$

$$= 180 + 36 = 216$$

$$\text{Required answer} = 216 / (24 \times 60 \times 60) = 1/400$$

17) Answer: D

$$= 8/56 \div 28/35 \div 40/224$$

$$= 8/56 \times 35/28 \times 224/40$$

$$= 1$$

18) Answer: D

Sum of $5/12$ and its inverse = $5/12 + 12/5$

$$= (25 + 144)/60 = 169/60$$

19) Answer: D

Let the fraction and its inverse be x and $1/x$ respectively.

According to Question-

$$x + 1/x = 13/6$$

From option (d)

Putting in the above equation-

$$3/2 + 2/3 = 13/6$$

$$\Rightarrow (9+4)/6 = 13/6$$

$$\Rightarrow 13/6 = 13/6$$

$$\text{Greater Fraction} = 1\frac{1}{2}$$

20) Answer: C

Let the fraction be $x/1$. Then its inverse will be $1/x$.

According to Question,

$$x/1 - 1/x = 3/4$$

$$\Rightarrow x - 1/x = 3/4$$

$$[a^3 - b^3 = (a - b)^3 + 3ab(a - b)]\text{-Formula}$$

$$= > x^3 - 1/x^3$$

$$= (3/4)^3 + 3 \cdot 3/4 \cdot 4/3 \cdot (3/4)$$

$$= 27/64 + 9/4$$

$$= (27 + 144)/64 = 171/64$$

21) Answer: B

Let the fraction be $1/x$.

According to Question,

$$1/4 - 1/x = 7/8$$

$$\Rightarrow 1/x = 1/4 - 7/8 = 2/8 - 7/8$$

$$\Rightarrow 1/x = -5/8$$

22) Answer: D

Second fraction = $11/12 - 5/6$

$$= 11/12 - 10/12 = 1/12$$

23) Answer: D

$$12/60 + 13/14 - 19/21 + 31/35 - 23/30$$

$$1/5 + 13/14 - 19/21 + 31/35 - 23/30$$

$$= (42 + 195 - 190 + 186 - 161)/210$$

$$\Rightarrow (423 - 351)/210$$

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$$\Rightarrow 72/210 = 12/35$$

24) Answer: C

Let, that fraction be x/y .

$$\Rightarrow x/y + 5/8 = 9$$

$$\Rightarrow x/y = 9 - \frac{5}{8} = 67/8 = 8 \frac{3}{8}$$

25) Answer: D

$$\text{That fraction} = 1 - \frac{1}{4} = 3/4 = 6/8$$

26) Answer: C

Dividing 0.3471 by 89 would yield 0.0039.

27) Answer: B

$$8/13 = 0.62 \text{ and } 12/17 = 0.71$$

Hence the value of the fraction will be greater than 0.62 but smaller than 0.71.

$$\text{a) } 1/2 = 0.50$$

$$\text{b) } 2/3 = 0.67$$

$$\text{c) } 7/8 = 0.87$$

$$\text{d) } 3/8 = 0.37$$

Hence option b) has a value of 0.67 which is larger than 0.62 but smaller than 0.71.

Hence the fraction will be $2/3$.

28) Answer: B

$$10/17 = 0.588$$

$$14/25 = 0.560$$

$$\text{so, } 10/17 > 14/25$$

29) Answer: A

$$1.004 + 1.40004 + 1.3450 - 1.547 = 2.20204$$

30) Answer: D

$$\text{From option a) } 0.1 \times 0.1 \times 0.1 \times 0.1 = 0.0001$$

$$\text{From option b) } 0.1 \times 0.03/3 = 0.001$$

$$\text{From option c) } 0.1 \times 0.01/2 = 0.0005$$

$$\text{From option d) } 0.1 \times 0.1 \times 0.02 \times 0.2 = 0.00004$$

Therefore, option d is the smallest.

31) Answer: C

From option-

$$\text{a) } 30/7 = 54/13 (\text{Wrong})$$

$$\text{b) } 30/7 = 44/13 (\text{Wrong})$$

$$\text{c) } 30/7 = 4.28$$

$$44/13 = 3.38$$

$$30/7 > 44/13 (\text{Right})$$

$$\text{d) } 30/7 < 44/13 (\text{Wrong})$$

32) Answer: A

Let fraction = x/y

According to Question,

$$(x+3)/(y+3) = 11/12$$

$$\Rightarrow 12x + 36 = 11y + 33$$

$$\Rightarrow 12x - 11y = -3 \dots (i)$$

Again,

$$(x-4)/(y-4) = 4/5$$

$$\Rightarrow 5x - 20 = 4y - 16$$

$$\Rightarrow 5x - 4y = 4 \dots (ii)$$

Solving equation (i) and (ii),

$$x = 8 \text{ and } y = 9$$

So, that fraction = $8/9$

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33) Answer: C

Let x be that smaller number.

According to Question,

$$\frac{4}{9} - x = \frac{1}{5}$$

$$x = \frac{4}{9} - \frac{1}{5}$$

$$\Rightarrow (20 - 9)/45 = 11/45$$

34) Answer: C

Let that fraction be x .

According to Question,

$$x \times \frac{7}{12} = \frac{3}{4}$$

$$\Rightarrow x = \frac{9}{7}$$

$$x = 1 \frac{2}{7}$$

35) Answer: B

On rationalization of $1/(5 - 2\sqrt{3})$.

$$= 1/(5 - 2\sqrt{3}) \times (5 + 2\sqrt{3})/(5 + 2\sqrt{3})$$

$$= (5 + 2\sqrt{3})/(25 - 12)$$

$$= (5 + 2\sqrt{3})/13$$

36) Answer: D

Total length of rod = $417 \frac{3}{5} = 2088/5$ cm

The given rod is to be cut into equal pieces of $23 \frac{1}{5}$ cm length.

Number of rods thus formed = Length of total rods / length of one part

$$= (2088/5)/(23 \frac{1}{5}) = (2088/5)/(116/5) = 2088/5 \times 5/116 = 2088/116 = 18$$

37) Answer: B

Roshan's part = $1/4$

Yashi's part = $2/3$

\therefore Tanya holds the rest.

So part of tanya = $1 - (1/4 + 2/3)$

$$= 1 - 11/12$$

$$= 1/12$$

38) Answer: D

Let numerator = x and denominator = y

$$x + y = 13 \dots\dots (i)$$

$$(x + 3)/(y + 9) = 2/3$$

$$3x + 9 = 2y + 18$$

$$3x + 9 = 2y + 18 \dots\dots (ii)$$

Solving equation (i) and (ii),

$$x = 7, y = 6$$

Ratio of numerator and denominator = $x : y = 7 : 6$

39) Answer: A

Number of winning matches = $36/54 = 0.667$

40) Answer: D

According to Question,

$$120/150 = 4/x$$

$$x = (150 \times 4)/120 = 5$$

41) Answer: C

By question,

$2/3 = 0.66$, $1/4 = 0.25$ and 0.3 in ascending order

$$0.25 < 0.3 < 0.66$$

$$1/4, 0.3, 2/3$$

Thus, the ascending order of option (c) is correct.

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42) Answer: B

a) $48/60=0.8$

b) $48/90=0.5333$

c) $48/120=0.4$

d) $48/30=1.6$

Hence option (b) is an example of a recurring decimal.

43) Answer: B

$$0.\overline{6} = 6/9 = 2/3$$

44) Answer: B

a) $162/300=0.54$

b) $8/15=0.5333333$

c) $30/96=0.3125$

d) $21/600=0.035$

Thus, option (b) is true.

45) Answer: C

$$207 \div 27 = 207/27 = (23 \times 9)/(3 \times 9) = 7 \frac{2}{3}$$

46) Answer: A

$$11/5 + 5/11$$

$$= (121 + 25)/55 = 146/55$$

47) Answer: C

According to Question,

$$a + 5/3 = 7/4$$

$$a = 7/4 - 5/3 = (21 - 20)/12 = 1/12$$

48) Answer: D

$$\text{Difference} = 75/36 - 30/16 = 25/12 - 15/8 = (50 - 45)/24 = 5/24$$

49) Answer: A

According to Question,

x and y are correct to 2 decimal places.

$$X = 4.57 \text{ and } y = 5.42$$

$$\text{Then, } x + y = 4.57 + 5.42 = 9.99$$

$$\text{upper limit of } x + y = 10.000$$

50) Answer: A

$$\text{Lost matches} = (81 - 54)/81$$

$$= 27/81$$

$$= 1/3$$

$$= 0.333$$

Problems on Ages

1) Sumit is three times the age of Sanket. After 8 years he will be 2 times the age of Sanket then find the present age of Sumit?

a) 32 years

b) 8 years

c) 16 years

d) 24 years

2) If the sum of the age of A, B and C is 56 years. If the age of A is twice of B who is twice the age of C then find the age of C after 3 years?

a) 11 years

b) 8 years

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c) 7 years

d) 14 years

3) If the ratio of present age of Arun and Ram is 7 : 9 and after 11 years the ratio becomes 9 : 10 then find the present age of Ram?

a) 11 years

b) 7 years

c) 10 years

d) 9 years

4) If the ratio of Rohit's age 2 years ago to the age of Parag after 2 years is 1 : 1. If at present the ratio of their ages is 5 : 3 then find the age of Rohit after 3 years?

a) 13 years

b) 10 years

c) 12 years

d) None of these

5) If the ratio of age of A and B, 6 years back is 3 : 5 and the ratio of their age after 6 years will be 4 : 5 then find the present age of B?

a) 12 years

b) 15 years

c) 18 years

d) 20 years

6) If the ratio of present age of A and B is 4 : 5 and that of C and B is 3 : 10. If the sum of their age is 84 years then find the age of B after 3 years?

a) 40 years

b) 46 years

c) 43 years

d) 51 years

7) If the ratio of present age of A and B is 2 : 5 and that of C and A is 3 : 4. If the sum of their age is 51 years then find the age of A before 1 year?

a) 11 years

b) 10 years

c) 12 years

d) 13 years

8) If the ratio of present age of Karan and Ajay is 5 : 7 and the sum of ages of Ajay and Vijay is 50 years. If the difference between the age of Karan and Vijay is 10 years then find the present age of Vijay?

a) 20 years

b) 25 years

c) 35 years

d) 15 years

9) Four years ago the age of Sumit was 4 times the age of Tarun. After three years Sumit becomes 3 times the age of Tarun. Find the present age of Tarun?

a) 21 years

b) 18 years

c) 20 years

d) 24 years

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10) If the age of A is 5 years more than B who is 3 years younger to C. If the sum of their age after 3 years is 65 years then find the ratio of present age of A & B?

- a) 24 : 25
- b) 24 : 23
- c) 19 : 24
- d) 21 : 16

11) If the age of Raj is $\frac{7}{5}$ times the age when he got married. The age of his wife is 42 years who is 75% the present age of Raj then find the age when Raj got married?

- a) 40 years
- b) 20 years
- c) 30 years
- d) 60 years

12) The age of a man after 13 years is 4 times the age of that man 8 years before. His present age is?

- a) 13 years
- b) 15 years
- c) 11 years
- d) 10 years

13) If the present age of mother is thrice the age of her daughter after four years. The age of mother is five times the age of her daughter then find the present age of Daughter?

- a) 2 years

b) 4 years

c) 8 years

d) 6 years

14) If the present age of Man is $11\frac{1}{9}\%$ times more than his wife. Age of their daughter is 10% of her father. Sum of their age after 5 years will be 85 then find the present age of Man?

a) 30 years

b) 15 years

c) 25 years

d) 35 years

15) If the age of P and Q, 10 years before was 1 : 3 and after 11 years the ratio becomes 2 : 3 then find the present age of Q?

a) 31 years

b) 21 years

c) 11 years

d) 42 years

16) If the age of A is 20% more than B who is 25% less than C. If the sum of their present age is 114 years then find the age of B after 5 years?

a) 31 years

b) 30 years

c) 35 years

d) None of these

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17) If the age of P is 120% of Q who is 100% more than R. If the sum of their present age is 81 years then find the age of Q before 3 years?

- a) 24 years
- b) 27 years
- c) 30 years
- d) 33 years

18) The average age of three students is 14 years when age of another student is included then average increases by 5 then find the age of included student?

- a) 42 years
- b) 36 years
- c) 28 years
- d) 34 years

19) The average age of three students is 16 years when age of another two students is included then average increases by 6 then find the average age of included students?

- a) 36 years
- b) 32 years
- c) 40 years
- d) Cannot be determined

20) Lalu's present age is 133.3% of his own age 6 years ago but Karan is 125% of what Lalu will be in 8 years hence. Find the present age of Karan?

- a) 40 years
- b) 21 years

c) 36 years

d) 32 years

21) If the ratio of the present age of A : B : C is 2 : 3 : 4. The average of their age after 2 years is 23 years then find the age of C, 3 years hence?

- a) 18 years
- b) 28 years
- c) 31 years
- d) 20 years

22) The age of A and B is x and 20 years respectively then after 5 years the ratio of their age's will become 2 : 5?

- a) 5 years
- b) 15 years
- c) 10 years
- d) Cannot be determined

23) Two years ago the average of age of A and B was 14 years and on joining of C the average of their age's increased by 2 years then find the age of C?

- a) 12 years
- b) 16 years
- c) 18 years
- d) None of these

24) In family, the average age of father and mother is 42 years. The average age of the father, mother and their only son is 36 years. What is the age of the son?

- a) Cannot be determined

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b) 12 years

c) 21 years.

d) 24 years.

25) Ten years ago, the age of Sudhir was thrice the present age of Priya and if the ratio of present age of Sudhir to Priya is 4 : 1 then find the present age of Sudhir?

a) 15 years

b) 10 years

c) 40 years

d) 20 years

26) Six years ago, the ratio of the age of Arjun and Birju was 3 : 7 and after four years the ratio of their age will be 1 : 2 then find the age of Birju ten years hence?

a) 86 years

b) 40 years

c) 92 years

d) 80 years

27) If the age of Ravi is 62.5% of his elder brother who is 37.5% less than his mother. If the present age of mother is 64 years then find the present age of Ravi?

a) 25 years

b) 20 years

c) 30 years

d) 35 years

28) If the ratio of age of A , B and C after 2 years is 5 : 8 : 6. If the sum of their present age is 70 years then find the present age of B?

a) 30 years

b) 32 years

c) 28 years

d) 34 years

29) If the age of Hema and Reena is in the ratio of 7 : 9. The difference between the age of Reena and Sumit is 15 years and the sum of present age of all three is 85 years then find the present age of Reena?

a) 54 years

b) 45 years

c) 27 years

d) 36 years

30) Pooja is 2 times more the age of Divya who is 300% the age of Shubham. If the difference between the age of Pooja and Shubham is 24 years then find the present age of Divya?

a) 9 years

b) 12 years

c) 15 years

d) 6 years

31) If the ratio between the ages of A , B , C is 11 : 12 : 19 and the age of C is 76 years then find the age of A after 2 years?

a) 42 years

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b) 40 years

c) 46 years

d) 44 years

32) If the ratio between the ages of P , Q , R is 10 : 11 : 5 and the age of Q after five years is 71 years then find the sum of ages of P and R before one year?

a) 92 years

b) 88 years

c) 90 years

d) 85 years

33) If the age of Sakshi is 8 years less than Sanket who is 12 years more than Srishti.If the average of their age is 18 years then find the present age of Sakshi?

a) 24.6 years

b) 16.6 years

c) 16 years

d) None of these

34) If the ratio of present age of Kamal to Shubh is 5 : 9 and the sum of their ages after 4 years was 64 years then find the present age of Shubh?

a) 40 years

b) 20 years

c) 27 years

d) 36 years

35) If the age of Ravi to Mohan is 13 : 15 and that of Mohan to Arun is 5 : 7 and the difference between the

age of Ravi and Arun is 16 years. Find the present age of Arun?

a) 42 years

b) 21years

c) 40 years

d) 44 years

36) The age of Raman and Priya is in the ratio of 6 : 10. Eight years hence the ratio becomes 5 : 7 respectively. If Nehal is twice the present the age of Priya then find his age after 2 years?

a) 42 years

b) 44 years

c) 45 years

d) None of these

37) If the sum of age of A , B and C is 36 years.Age of A is 16.6% of B who is thrice the age of C then find the sum of present age of B & C?

a) 36 years

b) 30 years

c) 32 years

d) 28 years

38) Five years ago , A was twice the age of B and five years hence B will be twice the age of C. If the sum of their present age is 60 years then find the age of B after 2 years?

a) 19.2 years

b) 21.2 years

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c) 20.4 years

d) None of these

39) If the ratio between the age of A and B after 5 years will be 6 : 7 and the difference of their ages is 10 years then find the age of B after 10 years?

a) 70 years

b) 55 years

c) 65 years

d) 75 years

40) If the ratio of age of A and B Five years hence is 6 : 7 and the ratio of age of A and B eight years hence is 8 : 9 then find the present age of A?

a) 4 years

b) 2 years

c) 8 years

d) 6 years

41) If the age of A is 10 years more than B who is twice the age of C. The average of their age is 20 years then find the age of A three year hence?

a) 20 years

b) 27 years

c) 33 years

d) 30 years

42) If the present age of Ayush and Kamla is 15 and 20 years then after how many years the ratio of their age becomes 7 : 8?

a) 20 years

b) 25 years

c) 15 years

d) 10 years

43) The age of Shivam is 30% less than Ramesh. If the sum of their age after 2 years is 55 years then find the present age of Ramesh?

a) 34 years

b) 30 years

c) 28 years

d) 18 years

44) If the age of Abhi is 55% of Tanay and the difference of their age is 27 years then find the age of Abhi?

a) 24 years

b) 27 years

c) 30 years

d) 33 years

45) If the age of Vishal is 32 and Dhruv is 40 years and after 'x' years the ratio of their age becomes 25 : 29 then find the value of 'x'?

a) 20 years

b) 12 years

c) 18 years

d) 30 years

46) If the age of A and B is 20 and 32 and the ratio after 15 years is 2 : 'x' then find the value of 'x'?

a) 37

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b) 47

c) 41

d) None of these

47) If Jay is 7 years younger to Vijay and the ratio of present age of Vijay to Ram is 5 : 3. If the present age of Ram is 33 years then find the present age of Jay?

a) 50 years

b) 55 years

c) 45 years

d) 48 years

48) If the product of age of A and B is 84 years and the sum of their age is 19 years then find the age of elder one?

a) 10 years

b) 12 years

c) 15 years

d) 25 years

49) If the sum of age of three person is 63 years out of which one is having the age of 23 years and the ratio of remaining two is 5 : 3 then find the age of youngest person?

a) 15 years

b) 16 years

c) 20 years

d) 23 years

50) If the age of Raman is 50% of Karan who is 50% more than Sumit. The sum of their age after one will be 68 years then find the present age of Karan?

a) 25 years

b) 20 years

c) 15 years

d) 30 years

Problems on Ages – Answers and Explanation

1) Answer: D

Solution: According to the question.

(Sumit) : (Sanket) = 3 : 1(1)

(Sumit)⁺⁸ : (Sanket)⁺⁸ = 2 : 1(2)

Balancing the ratios

(Sumit) : (Sanket) = 3 : 1(3)

(Sumit)⁺⁸ : (Sanket)⁺⁸ = 4 : 2(4)

1 unit = 8 years

Present age of Sumit = 3 * 8 = 24 years.

2) Answer: A

Solution:

According to the question

A + B + C = 56 years.....(1)

A : B : C = 4 : 2 : 1(2)

Sum = 7 units.

Actual sum = 56 years.

7 unit = 56 years

1 unit = 8 years

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Present age of C = 8 years.

Age of C after 3 years = 11 years

3) Answer: D

Solution:

Arun : Ram = 7 : 9(1)

Arun⁺¹¹ : Ram⁺¹¹ = 9 : 10(2)

Making the ratios common

Arun : Ram = 7 : 9(3)

Arun⁺¹¹ : Ram⁺¹¹ = 18 : 20(4)

11 units = 11 years

1 unit = 1 years.

Present age of Ram = 9 years.

4) Answer: A

Solution:

According to the question

$(R - 2) = (P + 2)$

$R - P = 4$ (1)

$R : P = 5 : 3$ (2)

Difference = 2 units

Actual difference = 4 years.

1 unit = 2 years.

Present age of Rohit = 10 years.

Age of Rohit after 3 years = 13 years

5) Answer: C

Solution:

$A^{-6} : B^{-6} = 3 : 5$ (1)

$A^{+6} : B^{+6} = 4 : 5$ (2)

Re-arranging the ratios

$A^{-6} : B^{-6} = 3 : 5$ (3)

$A^{+6} : B^{+6} = 8 : 10$ (4)

5 units = 12 years

1 unit = 12/5 years

B's age after 6 years = 24 years

Present age of B = 18 years

6) Answer: C

Solution:

According to the question

$A : B = 4 : 5$ (1)

$C : B = 3 : 10$ (2)

Making ratios common

$A : B : C = 8 : 10 : 3$ (3)

Sum = 21 units

Actual sum = 84 years

21 units = 84 years

1 unit = 4 years.

Present age of B = 40 years.

Age of B after three years = 43 years

7) Answer: A

Solution:

According to the question

$A : B = 2 : 5$ (1)

$C : A = 3 : 4$ (2)

Making ratios common

$A : B : C = 4 : 10 : 3$ (3)

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Sum = 17 units

Actual sum = 51 years

17 units = 51 years

1 unit = 3 years.

Present age of A = 12 years.

Age of A one years ago = 11 years.

8) Answer: D

Solution:

According to the question

$K : A = 5 : 7$ (1)

$A + V = 50$ (2)

$K - V = 10$ (3)

From eq (2) & eq (3)

$A + K = 60$ years

From eq (1)

Sum = 12 units

12 units = 60 years

1 unit = 5 years

Present age of Ajay = 35 years.

Sum of ages of Ajay and Vijay is 50 years.

So, Present age of vijay = 15 years.

9) Answer: B

Solution:

$(S - 4) = 4(T - 4)$

$4T - S = 12$ (1)

$(S + 3) = 3(T + 3)$

$S - 3T = 6$ (2)

On solving the above equations

Tarun = 18 years

10) Answer: D

Solution: According to the condition.

$A - B = 5$ (1)

$C - B = 3$ (2)

The sum of their age after 3 years is 65

$A + 3 + B + 3 + C + 3 = 65$

$A + B + C = 56$ (3)

On solving the above equations.

$5 + B + B + 3 + B = 56$

$B = 16$ years.

$A = 21$ years.

Ratio , 21 : 16

11) Answer: A

Solution: According to the condition.

Raj (present): Raj (Married) = 7 : 5(1)

Wife : Raj (present) = 3 : 4(2)

Making ratios common.

$R(P) : R(M) : W = 28 : 20 : 21$ (3)

Present age of wife = 42 years.

21 units = 42 years

1 unit = 2 years.

Age when Raj got married = 40 years.

12) Answer: B

Solution:

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Let present age of man = x

$$(x+13)=4(x-8)$$

$$X+13=4x-32$$

$$45=3x$$

$$X=15$$

13) Answer: D

Solution: According to the question.

$$M = 3 (D + 4)$$

$$M - 3D = 12 \text{ years} \dots\dots\dots(1)$$

$$M = 5D \dots\dots\dots(2)$$

From above equations.

$$2D = 12 \text{ years}$$

$$D = 6 \text{ years.}$$

14) Answer: D

$$\textbf{Solution: } M : W = 10 : 9 \dots\dots\dots(1)$$

$$M : D = 10 : 1 \dots\dots\dots(2)$$

Common ratios will be -

$$M : W : D = 10 : 9 : 1 \dots\dots\dots(3)$$

Present sum = 20 units.

Actual sum after 5 years = 85 years.

Present sum = 70 years

20 units = 70 years.

1 unit = 3.5 years.

Present age of Man = $10 * 3.5 = 35$ years.

15) Answer: A

Solution: According to the condition.

$$P^{-10} : Q^{-10} = 1 : 3 \dots\dots\dots(1)$$

$$P^{+11} : Q^{+11} = 2 : 3 \dots\dots\dots(2)$$

Balancing the ratios.

$$P^{-10} : Q^{-10} = 1 : 3 \dots\dots\dots(3)$$

$$P^{+11} : Q^{+11} = 4 : 6 \dots\dots\dots(4)$$

3 units = 21 years.

1 unit = 7 years.

Age of Q ten years before = 21 years.

Present age of Q = 31 years.

16) Answer: C

Solution: According to the condition.

$$A : B = 6 : 5 \dots\dots\dots(1)$$

$$B : C = 3 : 4 \dots\dots\dots(2)$$

Making the ratios common.

$$A : B : C = 18 : 15 : 24 \dots\dots\dots(3)$$

Sum = 57 years.

Actual sum = 114 years.

57 units = 114 years.

1 unit = 2 years.

Present age of B = 30 years.

Age of B after 5 years = 35 years.

17) Answer: B

Solution: According to the condition.

$$P : Q = 6 : 5 \dots\dots\dots(1)$$

$$Q : R = 2 : 1 \dots\dots\dots(2)$$

Making common ratios.

$$P : Q : R = 12 : 10 : 5 \dots\dots\dots(3)$$

$P + Q + R = 81$ years.

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Sum = 27 units.

Actual sum = 81 years.

27 units = 81 years.

1 unit = 3 years.

Present age of Q = 30 years.

Age of Q before 3 years = 27 years.

18) Answer: D

Solution: Let three students be A , B and C.

$A + B + C = 42$ years.

When age of another student say D will be included then

,

$A + B + C + D = 76$ years.

On subtracting,

$D = 34$ years.

19) Answer: C

Solution: Let three students be A , B and C.

$A + B + C = 48$ years.

When age of another student say D will be included then

,

$A + B + C + D = 88$ years.

On subtracting,

$D = 40$ years.

20) Answer: A

Solution: Lalu : $(\text{Lalu} - 6) = 4 : 3$

Lalu = 24 years.

Lalu after 8 years = 32 years.

Lalu : Karan = 4 : 5

4 unit = 32 years

1 unit = 8 years.

Age of Karan = 40 years.

21) Answer: C

Solution: $A : B : C = 2 : 3 : 4 \dots\dots(1)$

Sum = 9 units

Sum after two years = 69 years.

Sum at present = 63 years.

9 unit = 63 years.

1 unit = 7 years.

Present age of C = 28 years.

Age three years hence = 31 years.

22) Answer: A

Solution: According to the question.

$(A + 5) : (B + 5) = 2 : 5$

$(x + 5) : (20 + 5) = 2 : 5$

On solving we get,

$x = 5$ years.

23) Answer: B

Solution: According to the question.

$(A - 2) + (B - 2) = 28$

Present sum = $A + B = 32$ years.....(1)

When C , joins them

Sum , $A + B + C = 16 * 3$

$A + B + C = 48$ years.....(2)

$C = 16$ years.

24) Answer: D

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Solution:

The age of father and mother is $=42 \times 2 = 84$ years

And total age of father, mother and son $=36 \times 3 = 108$ years

Age of son $=108 - 84 = 24$ years

25) Answer: C

Solution: According to the question.

$$(S - 10) = 3P$$

$$S - 3P = 10 \dots\dots(1)$$

$$S : P = 4 : 1 \dots\dots\dots(2)$$

From above two equations.

$$S = 40 \text{ years}$$

$$P = 10 \text{ years}$$

26) Answer: A

Solution: $A^{-6} : B^{-6} = 3 : 7 \dots\dots\dots(1)$

$$A^{+4} : B^{+4} = 1 : 2 \dots\dots\dots(2)$$

On balancing the ratios.

$$A^{-6} : B^{-6} = 3 : 7 \dots\dots\dots(3)$$

$$A^{+4} : B^{+4} = 4 : 8 \dots\dots\dots(4)$$

$$1 \text{ units} = 10 \text{ years}$$

$$\text{Age of Birju six years back} = 70 \text{ years}$$

$$\text{Present age of Birju} = 76$$

$$\text{Age of Birju ten years hence} = 86 \text{ years}$$

27) Answer: A

Solution: According to the question.

$$R : B = 5 : 8 \dots\dots\dots(1)$$

$$B : M = 5 : 8 \dots\dots\dots(2)$$

Making common ratios.

$$R : B : M = 25 : 40 : 64$$

$$\text{Present age of Mother} = 64 \text{ years.}$$

$$1 \text{ unit} = 1 \text{ years.}$$

$$\text{Present age of Ravi} = 25 \text{ years.}$$

28) Answer: A

Solution: According to the question.

$$A^{+2} : B^{+2} : C^{+2} = 5 : 8 : 6 \dots\dots\dots(1)$$

$$A + B + C = 70 \text{ years.}$$

$$(A + 2) + (B + 2) + (C + 2) = 70 + 6 \dots\dots\dots(2)$$

$$19 \text{ units} = 76 \text{ years.}$$

$$1 \text{ unit} = 4 \text{ years.}$$

$$\text{Age of B after 2 years} = 32 \text{ years.}$$

$$\text{Present age of B} = 30 \text{ years.}$$

29) Answer: D

Solution: According to the question.

$$H + R + S = 85 \dots\dots\dots(1)$$

$$H : R = 7x : 9x \dots\dots\dots(2)$$

$$R - S = 15 \dots\dots\dots(3)$$

From above equations.

$$H + 2R = 100 \dots\dots\dots(4)$$

$$25x = 100 \text{ years}$$

$$x = 4 \text{ years.}$$

$$\text{Present age of Reena} = 9 \times 4 = 36 \text{ years.}$$

30) Answer: A

Solution: According to the question.

$$P : D = 3 : 1 \dots\dots\dots(1)$$

$$D : S = 3 : 1 \dots\dots\dots(2)$$

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Making the ratios common.

$$P : D : S = 9 : 3 : 1 \dots\dots\dots(3)$$

Difference = 8 units.

Actual difference = 24 years.

8 unit = 24 years.

1 unit = 3 years.

Present age of Divya = 9 years.

31) Answer: C

Solution: According to the question.

$$A : B : C = 11 : 12 : 19 \dots\dots\dots(1)$$

Age of C = 76 years.

So, 19 unit = 76 years.

1 unit = 4 years.

Present age of A = 44 years.

Age of A after two years = 46 years.

32) Answer: B

Solution: According to the question.

$$P : Q : R = 10 : 11 : 5 \dots\dots\dots(1)$$

Q's age after 5 years = 71 years.

Q's present age = 66 years.

So, 11 unit = 66 years.

1 unit = 6 years.

Sum of P and R = 15 units

Sum of P & R = 90 years.

Sum of their age before one year = 88 years.

33) Answer: B

Solution: According to the question.

$$\text{Sakshi} = \text{Sanket} - 8 \dots\dots\dots(1)$$

$$\text{Sanket} = \text{Srishti} + 12 \dots\dots\dots(2)$$

$$\text{Sum} = 54 \text{ years} \dots\dots\dots(3)$$

From above equations.

$$3 \text{ Sanket} = 74 \text{ years.}$$

$$\text{Sanket} = 24.6 \text{ years.}$$

$$\text{Sakshi} = 16.6 \text{ years.}$$

34) Answer: D

$$\text{Solution: } K^0 : S^0 = 5 : 9 \dots\dots\dots(1)$$

According to the condition.

$$K + 4 + S + 4 = 64$$

$$K + S = 56 \dots\dots\dots(2)$$

From eq(1) & eq(2) we get,

$$14 \text{ units} = 56 \text{ years.}$$

$$1 \text{ unit} = 4 \text{ years.}$$

$$\text{Present age of Shubh} = 36 \text{ years.}$$

35) Answer: A

$$\text{Solution: } R : M = 13 : 15 \dots\dots\dots(1)$$

$$M : A = 5 : 7 \dots\dots\dots(2)$$

Common ratios.

$$R : M : A = 13 : 15 : 21 \dots\dots\dots(3)$$

Difference = 8 unit

$$8 \text{ unit} = 16 \text{ years.}$$

$$1 \text{ unit} = 2 \text{ years.}$$

$$\text{Present age of Arun} = 42 \text{ years.}$$

36) Answer: A

Solution: According to the question.

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$$R^0 : P^0 = 6 : 10 \dots\dots(1)$$

$$R^{+8} : P^{+8} = 5 : 7 \dots\dots(2)$$

Balancing ratios.

$$R^0 : P^0 = 12 : 20 \dots\dots(3)$$

$$R^{+8} : P^{+8} = 20 : 28 \dots\dots(4)$$

$$8 \text{ units} = 8 \text{ years}$$

$$1 \text{ unit} = 1 \text{ years}$$

Present age of Priya = 20 years.

Nehal's present age = 40 years.

Age after 2 years = 42 years.

37) Answer: C

Solution: According to the question.

$$A + B + C = 36 \text{ years.}$$

$$A : B = 1 : 6 \dots\dots(1)$$

$$B : C = 3 : 1 \dots\dots(2)$$

From the above equations.

$$A : B : C = 1 : 6 : 2 \dots\dots(3)$$

$$\text{Sum} = 9 \text{ units.}$$

$$\text{Actual sum} = 36 \text{ years.}$$

$$1 \text{ unit} = 4 \text{ years.}$$

$$\text{Sum of present age of B \& C} = 8 \text{ units.}$$

$$\text{Sum of present age of B \& C} = 32 \text{ years.}$$

38) Answer: B

Solution: According to the question.

$$(A - 5) = 2 (B - 5)$$

$$2B - A = 5 \dots\dots(1)$$

$$(B + 5) = 2 (C + 5)$$

$$B - 2C = 5 \dots\dots(2)$$

$$A + B + C = 60 \dots\dots(3)$$

$$2B - 5 + B + (B - 5)/2 = 60$$

$$7B = 135$$

$$B = 19.28 \text{ years}$$

$$\text{Age after 2 years} = 21.28 \text{ years.}$$

39) Answer: D

Solution: According to the condition.

$$A^{+5} : B^{+5} = 6 : 7 \dots\dots(1)$$

$$\text{Difference} = 1 \text{ units.}$$

$$\text{Actual difference} = 10 \text{ years.}$$

$$1 \text{ unit} = 10 \text{ years.}$$

$$B's \text{ age after 5 years} = 70 \text{ years.}$$

$$\text{Present age of B} = 65 \text{ years.}$$

$$B's \text{ age after 10 years} = 75 \text{ years.}$$

40) Answer: A

$$\text{Solution: } A^{+5} : B^{+5} = 6 : 7 \dots\dots(1)$$

$$A^{+8} : B^{+8} = 8 : 9 \dots\dots(2)$$

$$2 \text{ units} = 3 \text{ years}$$

$$1 \text{ unit} = 3/2 \text{ years}$$

$$A's \text{ age after 5 years} = (6 \times 3)/2 = 9 \text{ years}$$

$$A's \text{ Present age} = 4 \text{ years}$$

41) Answer: C

Solution: According to the question.

$$A = B + 10 \dots\dots(1)$$

$$B = 2C \dots\dots(2)$$

$$A + B + C = 60 \dots\dots(3)$$

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From the above equations.

$$5C = 50$$

$$C = 10 \text{ years}$$

$$B = 20 \text{ years}$$

$$A = 30 \text{ years}$$

$$\text{Age of A after 3 years} = 33 \text{ years.}$$

42) Answer: A

Solution:

According to the question.

$$(\text{Ayush} + x) / (\text{Kamla} + x) = 7/8$$

$$(15 + x) / (20 + x) = 7/8$$

On solving the above we get,

$$x = 20 \text{ years.}$$

43) Answer: B

Solution: Shivam : Ramesh = 7 : 10(1)

$$\text{Sum} = 17 \text{ units}$$

$$\text{Sum of age 2 years hence} = 55 \text{ years}$$

$$\text{Present sum} = 51 \text{ units}$$

$$17 \text{ units} = 51 \text{ years}$$

$$1 \text{ unit} = 3 \text{ years}$$

$$\text{Present age of Ramesh} = 30 \text{ years.}$$

44) Answer: D

Solution: Abhi : Tanay = 11 : 20.....(1)

$$\text{Difference of age} = 9 \text{ units}$$

$$9 \text{ unit} = 27 \text{ years}$$

$$1 \text{ unit} = 3 \text{ years}$$

$$\text{Present age of Abhi} = 33 \text{ years.}$$

45) Answer: C

Solution: According to the question.

$$(\text{Vishal} + x) / (\text{Dhruv} + x) = 25/29$$

$$(32 + x) / (40 + x) = 25/29$$

On solving we get,

$$x = 18 \text{ years}$$

46) Answer: B

Solution: According to the question.

$$A = 20 \text{ years} \quad \& \quad B = 32 \text{ years}$$

According to the question.

$$(20 + 15) / (32 + 15) = 35 / x$$

On solving above we get,

$$x = 47$$

47) Answer: D

Solution: According to the question.

$$\text{Vijay} - \text{Jay} = 7 \text{(1)}$$

$$\text{Vijay} : \text{Ram} = 5 : 3 \text{(2)}$$

$$\text{Present age of Ram} = 33 \text{ years.}$$

$$3 \text{ units} = 33 \text{ years.}$$

$$1 \text{ unit} = 11 \text{ years.}$$

$$\text{Present age of Vijay} = 55 \text{ years}$$

$$\text{Present age of Jay} = 48 \text{ years.}$$

48) Answer: B

Solution: Let the ages be x and y years. Where $x > y$

$$x * y = 84 \text{(1)}$$

$$x + y = 19 \text{ years.....(2)}$$

On solving above we get,

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$x = 12$ years & $y = 7$ years

49) Answer: A

Solution: According to the question.

$$A + B + C = 63 \dots\dots\dots(1)$$

Let $C = 23$ years.

$$A + B = 40 \text{ years.}$$

$$A : B = 5 : 3 \dots\dots\dots(2)$$

$$\text{Sum} = 8 \text{ units}$$

$$\text{Actual sum} = 40 \text{ years.}$$

$$8 \text{ unit} = 40 \text{ years}$$

$$1 \text{ unit} = 5 \text{ years}$$

$$A = 20 \text{ years.}$$

$$B = 15 \text{ years.}$$

50) Answer: D

Solution: According to the question.

$$\text{Raman} : \text{Karan} : \text{Sumit} = 3 : 6 : 4 \dots\dots\dots(1)$$

$$\text{Sum} = 13 \text{ units.}$$

$$\text{Actual sum after one year} = 68 \text{ years.}$$

$$\text{Present Sum} = 65 \text{ years.}$$

$$13 \text{ units} = 65 \text{ years.}$$

$$1 \text{ unit} = 5 \text{ years.}$$

$$\text{Present age of Karan} = 6 * 5 = 30 \text{ years.}$$

Problems on Trains

1) Two trains are running towards each other at the speed of 36 kmph and 54 kmph crosses each other in 20 seconds. If the length of first train is 50% more than that of second trains then find the length of faster train?

- a) 400m
- b) 300m
- c) 100m
- d) 200m

2) Two trains are running towards each other at the speed of 20 mps and 15 mps crosses each other in $\frac{1}{2}$ minutes. If the length of first train is 150% that of second train then find the length of shorter train?

- a) 420m

b) 210m

c) 350m

d) 490m

3) Two trains are running towards each other at the speed of 36 kmph and 14 mps crosses each other in 15 seconds. If the length of first train to that of second train is in the ratio of 3 : 1 then find the length of slower train?

- a) 90 m
- b) 270 m
- c) 180 m
- d) None of these

4) Train A, crosses a platform of length 200 m in 20 seconds after some time it crosses another train B of

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same length in 10 seconds from opposite direction. If the speed of Train B is 36 kmph then find the length of train A?

- a) 400/3 m.
- b) 100/3 m.
- c) 200/3 m.
- d) 100 m.

5) Train A , crosses a bridge of length 250m in 15 seconds after some time it crosses another train B of same length in 10 seconds in same direction. If the speed of Train B is 10m/s then find the Speed of train A?

- a) 10 m/s
- b) 20 m/s
- c) 25 m/s
- d) None of these

6) If a train crosses a platform double of its length in 30 seconds and after some time it again crosses a bridge double of platforms length in 20 seconds then find the speed of train?

- a) 36 kmph
- b) Cannot be determined
- c) 18 kmph
- d) 54 kmph

7) If a train crosses a bridge equal of its length in 15 seconds and the length of train is 200 meters then find the speed of train?

- a) 96 kmph
- b) 80 kmph
- c) 108 kmph
- d) None of these

8) If a train crosses a man standing on a platform in 10 seconds and the same platform of length 300m and in 25 seconds then find the length of train?

- a) 250 m
- b) 300 m
- c) 100 m
- d) 200 m

9) If a train crosses a bridge 87.5% of its length in 15 seconds and the length of the train in 160 m then finds the speed of train?

- a) 72 kmph
- b) 36 kmph
- c) 54 kmph
- d) 18 kmph

10) Two trains A and B travelling towards each other with the speed of 20 mps and 25mps crosses in 1/6 minutes. If the total length of the trains is (x) meters then find the total length of trains?

- a) 450 m
- b) 350 m
- c) 250 m
- d) 500 m

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11) A train crosses a truck in opposite direction in $\frac{1}{3}$ minutes. If the speed of truck was 54 kmph and train was moving with 15m/s find the length of train? Assume that the length of truck is negligible in front of train.

- a) 60 m
- b) 400 m
- c) 500 m
- d) 600 m

12) A train crosses a bus in opposite direction in 33 seconds. If the speed of bus was 36 kmph and train was moving with 15m/s find the length of train? Assume that the length of bus is 10% length of train.

- a) 650 m
- b) 750 m
- c) 250 m
- d) 500 m

13) If the ratio of speed of two trains is in the ratio of 5 : 4 and they crosses each other completely in 20 seconds in opposite direction. If the length of faster train is 200 meter and length of smaller train is 75% of faster train then find the speed of fastest train?

- a) 8 mps
- b) 8.72 mps
- c) 9 mps
- d) 9.72 mps

14) If the ratio of speed of two trains is in the ratio of 2 : 1 and they crosses each other completely in $\frac{4}{5}$ minutes in same direction. If the length of faster train is 200 meter and length of slower train is 50% of faster train then find the speed of slower train?

- a) 1.08 mp
- b) 2 mps
- c) 2.08 mps
- d) 2.98 mps

15) Train A can travel with the speed of 45 kmph without stoppage and takes 6 hours to reach the destination but due to some technical work train takes several stoppage and reach destination 3 hours late. Find the reduced speed of the train?

- a) 60 kmph
- b) 30 kmph
- c) 90 kmph
- d) 75 kmph

16) Train is travelling with the speed of 36 kmph without stoppage and takes 5 hours to reach the destination but due to some water logging train takes several stoppage and reach destination 30 minutes late. Find the total stoppage taken by the train if each stop was of 2 minutes?

- a) 14
- b) 15
- c) 30

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d) 0

17) If the ratio of time taken by two trains to cover a certain distance is 5 : 3 then find their speed ratio to cover the same distance?

a) 5 : 3

b) 3 : 5

c) 4 : 5

d) Cannot be determined

18) If train A is travelling with 75% of the speed of train B and takes 2 hours more to cover a certain distance(D) then find the time taken by Train A to cover (D + 100) km distance?

a) 24.6 hours

b) 20 hours

c) 10.6 hours

d) Cannot be determined

19) If train A is travelling with 50% more than the speed of train B and takes 1 hours less to cover a certain distance then find the time taken by Train B to cover total distance(2D)?

a) 2 hours

b) 3 hours

c) 6 hours

d) Cannot be determined

20) If Train A and Train B is travelling with 30 kmph and 45 kmph respectively, A takes 1 hours more to

cover a certain distance(D) then find the time taken by Train B to cover (2D + 20) km distance?

a) 10 hours

b) 200 hours

c) 300 hours

d) 100 hours

21) If the speed of Train is (x) kmph and it crosses a pole in 10 seconds and then a man walking with 5 mps speed towards it in 5 seconds then find the speed of train?

a) 18 kmph

b) 36 kmph

c) 54 kmph

d) 8 kmph

22) If the speed of Train is 36 kmph and it crosses a signal in 20 seconds and then a platform of length 200m in 40 seconds then find the length of train?

a) 150 m

b) 100 m

c) 200 m

d) None of these

23) Total distance cover by a train is 400 km. If a train covers 40% of distance in 5 hours , 60% of the distance in 8 hours , 50% of the distance in 2 hours and 25% of the distance in 1 hours then find the average speed of train?

a) 43.75 kmph

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b) 44.75 kmph

c) 45.75 kmph

d) Cannot be determined

24) If Train A can cover 126 km in 8 hours while train B can cover 130 km in 12 hours then find the average speed of trains?

a) 12 kmph

b) 13.8 kmph

c) 12.8 kmph

d) 10.8 kmph

25) If Train A can cover 121 km in 5 hours, Train B can cover 111 km in 9 hours while train C can cover 139 km in 11 hours then find the average speed of trains?

a) 12.8 kmph

b) 14.8 kmph

c) 16.8 kmph

d) None of these

26) Train A crosses Train B coming from opposite direction in 20 seconds and takes 30 seconds when travelling in same direction. If the length of Train A and Train B is 200m and 300m then find the speed of train A?

a) 22.5 m/s

b) 12.5 m/s

c) 20.5 m/s

d) Cannot be determined

27) Train A completely crosses Train B travelling in same direction in 40 seconds and takes 10 seconds to cross each other. If the length of Train A & Train B is 250m & 350m then find the speed of train B?

a) 12.5 m/s

b) 32.5 m/s

c) 45.5 m/s

d) 22.5 m/s

28) If train A can cover 100 km in 5 hours whose speed is 80% of the speed of Train B. Find the distance covered by Train B in one hour?

a) 16 kms

b) 26 kms

c) 36 kms

d) None of these

29) If the average speed of Train A and Train B is 25 kmph while train A can cover 100 km in 5 hours and Train B takes 8 hours to cover distance (D). Find the speed of Train B to cover (3D) distance?

a) 94.375 kmph

b) 80.375 kmph

c) 84.375 kmph

d) None of these

30) If the average speed of Train A and Train B is 32.5 kmph while train A can cover 150 km in 7 hours and Train B takes 9 hours to cover distance (D). Find the speed of Train B?

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- a) 41.1 kmph
- b) 31.1 kmph
- c) 51.1 kmph
- d) Cannot be determined

31) A train having speed 900% to the time taken by it to cover a distance of 22500 meters then find the time taken by the same train to cover a distance of 360 km?

- a) 46.67 minutes.
- b) 36.67 minutes.
- c) 16.67 minutes.
- d) 13.33 minutes.

32) A train takes 10 seconds to cross a platform thrice of its length and 20 seconds to cross a bridge double of platforms length then find the speed of train?

- a) 18 kmph
- b) Cannot be determined
- c) None of these
- d) 20m/s

33) A train takes 20 seconds to cross a Bridge of 300m in length and 30 seconds to cross a platform double of train's length then find the speed of train?

- a) 10 m/s
- b) 30 m/s
- c) 20 m/s
- d) 40m/s

34) If a train crosses a pole in 1/10 minutes then find the speed of train if its length is 360 meters?

- a) 216 kmph
- b) 196 kmph
- c) 80 kmph
- d) None of these

35) If a train crosses a bridge double of its length in 30 seconds when travelling with 36kmph then find the time taken to cross the same bridge with 45kmph.

- a) 24 sec
- b) 25 sec
- c) 20 sec
- d) None of these

36) If a train crosses a platform equal of its length in 20 seconds when travelling with 18 kmph then find the time taken to cross the same platform with 36 kmph? Given : length of train = 200 m.

- a) 15 sec
- b) 20 sec
- c) 10 sec
- d) None of these

37) Train A, left Bhopal station at 7:30 PM towards Delhi with the speed of 60 kmph. Another Train B left Delhi station at 8:30 PM towards Bhopal with the speed of 75 kmph find the time when both the trains meet each other? Given that the distance between Bhopal to Delhi is 450km.

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- a) 3 hours
- b) Cannot be determined
- c) None of these
- d) 3.77 hours

38) Train P, left Bhopal station at 8:00 AM towards Nagpur with the speed of 50 kmph. Another Train Q left Nagpur station at 8:30 PM towards Bhopal with the speed of 60 kmph find the time when both the trains meet each other? Given that the distance between Bhopal to Nagpur is 750km.

- a) 5.54 hours
- b) 6.54 hours
- c) 4.54 hours
- d) Cannot be determined

39) Train A, left Delhi station at 10:00 AM towards Mumbai with the speed of 50 kmph. Another Train B left Mumbai station at 10:30 AM towards Delhi with the speed of 30 kmph Both the trains meet each other after 4.25 hours then find distance between Delhi to Mumbai?

- a) 355 kms
- b) 375 kms
- c) 380 kms
- d) Cannot be determined

40) Train P, left Delhi station at 6:00 AM towards Bhopal with the speed of 50 kmph. Another Train Q left Bhopal station at 5:30 AM towards Delhi with the

speed of 30 kmph both the trains meet each other after 3.5 hours then find distance between Delhi to Bhopal?

- a) 280 kms
- b) 265 kms
- c) 250 kms
- d) Cannot be determined

41) Find the length of the train if it crosses a bridge of length 200meter in 15 seconds and a pole in 10 seconds?

- a) 400 m.
- b) 200 m.
- c) 100 m.
- d) 250 m.

42) Find the time taken by Train A of length 150m to cross a man standing in train B of length 200m if the speed of Train A & Train B is 20m/s & 15m/s?

- a) 20 Sec
- b) 15 Sec
- c) 30 Sec
- d) 10 Sec

43) Find the time taken by a man to cross a train of length 150m standing at 750meter away from him if he is travelling with the speed of 5 m/s?

- a) 80 sec.
- b) 180 sec.
- c) 280 sec.

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d) None of these

44) Find the length of a bridge if a train crosses it in 20 seconds with the speed of 36kmph and the same train crosses a signal in 10 seconds?

a) 200 m.

b) 100 m.

c) 300 m.

d) 400 m.

45) Find the length of platform, if length of platform is $33\frac{1}{3}\%$ of trains length and crosses platform with the speed of 20m/s in 40 seconds?

a) 100 m

b) 200 m

c) 150 m

d) 250 m

46) Find the length of river basin which is crossed by Amar express in 50 seconds when running with 36 kmph.length of Train is 150 meter?

a) 350 m

b) 300 m

c) 320 m

d) 400 m

47) A train takes 15 seconds to cross a signal and 20 seconds to cross a platform of length 250 meter then find the speed of train in kmph?

a) 160 kmph

b) 200 kmph

c) 180 kmph

d) None of these

48) Chennai express is travelling with a speed of 36 kmph to reach its destination in 6 hours but after reaching 16.6% of distance engine gets failed due to which train gets delayed by 35 minutes. Find by how much percent driver needs to increase trains speed to reach destination on time?

a) 13.19%

b) 23.19%

c) 16.19%

d) 11.19%

49) Vivek express is travelling with a speed of 20 m/s to reach its destination in 6 hours but after reaching 50% of distance engine gets failed due to which train gets delayed by 25 minutes. Find by how much percent driver needs to increase trains speed to reach destination on time?

a) 6.125%

b) 26.125%

c) 18.125%

d) 16.125%

50) Find the length of platform which is crossed by a train of 150m long with the speed of 36 kmph in 20 seconds?

a) 50 m.

b) 150 m.

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c) 100 m.

d) 200 m.

Problems on Trains – Answers and Explanation

1) Answer: D

Solution:

According to the question,

Let length of Train A = $3x$ meter.

Length of Train B = $2x$ meter.

$(\text{Speed}_A + \text{Speed}_B) = (\text{Length of Train A} + \text{Length of Train B}) / \text{Time} \dots\dots\dots(1)$

$$(36 + 54) \times 5/18 = (3x + 2x)/20$$

$$x = 100\text{m}$$

$$\text{Length of faster train (B)} = 100 \times 2 = 200\text{m}$$

2) Answer: A

Solution:

According to the question,

Let length of Train A = $3x$ meter

Length of Train B = $2x$ meter

$(S_A + S_B) = (\text{Length of Train A} + \text{Length of Train B}) / \text{Time} \dots\dots\dots(1)$

$$(20 + 15) = (3x + 2x) / 30$$

$$x = 210\text{m}$$

$$\text{Length of Shorter train (B)} = 2x = 210 \times 2 = 420\text{m.}$$

3) Answer: B

Solution:

According to the question,

$$\text{Speed of train A} = 36 \text{ kmph} = 36 \times 5/18 = 10 \text{ m/s}$$

Speed of train B = 14 m/s

Let length of Train A = $3x$ meter

Length of Train B = $1x$ meter

$(S_A + S_B) = (\text{Length of Train A} + \text{Length of Train B}) / \text{Time} \dots\dots\dots(1)$

$$(10 + 14) = (3x + x) / 15$$

$$x = 90 \text{ m}$$

$$\text{Length of Slower train (A)} = 3x = 90 \times 3 = 270 \text{ m}$$

4) Answer: A

Solution:

According to the question,

$$\text{Speed of train B} = 36 \text{ kmph} = 36 \times 5/18 = 10 \text{ m/s}$$

Speed of train A = $x \text{ m/s}$

Let length of Train A = Length of Train B = (L) meter

$(S_A + S_B) = (\text{Length of Train A} + \text{Length of Train B}) / \text{Time} \dots\dots\dots(1)$

$$(10 + x) = (L + L) / 10$$

$$(10 + x) = (L) / 5 \dots\dots\dots(2)$$

Train A, crosses a platform of length 200 m in 20 seconds

$$x = (L + 200) / 20 \dots\dots\dots(3)$$

From eq (2) & eq (3)

$$\text{Length of Train A} = L = 400/3 \text{ meter}$$

5) Answer: B

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Solution:

According to the question,

Speed of train B = 20 m/s

Speed of train A = x m/s

Let length of Train A = Length of Train B = L meter

$(S_A + S_B) = (\text{Length of Train A} + \text{Length of Train B})/\text{Time} \dots\dots\dots(1)$

$$(x - 10) = (2L)/10$$

$$(x - 10) = L/5 \dots\dots\dots(2)$$

Train A, crosses a bridge of length 250 m in 15 seconds

$$x = (L + 250)/15 \dots\dots\dots(3)$$

From eq (2) & eq (3)

Length of Train A = L = 50 meter

$$X = (50 + 250)/15 = 20 \text{ m/s}$$

Speed of Train A = 20 m/s

6) Answer: B

Solution:

According to the question,

Speed of train = x m/s.

Let length of Train = L meter

Let length of platform = 2L meter

Let length of bridge = 4L meter

Speed = $(\text{Length of Train} + \text{Length of Platform})/\text{Time} \dots\dots\dots(1)$

$$\text{Speed} = 3L/30$$

$$10S = L \dots\dots\dots(2)$$

$S = (\text{Length of Train} + \text{Length of bridge})/\text{Time}$

$$4S = L \dots\dots\dots(3)$$

From eq (2) and eq (3) we can say that both the variables will get cancelled hence answer will be cannot be determined.

7) Answer: A

Solution:

According to the question,

Speed of train = x m/s

Let length of Train = 200 meter

Let length of bridge = 200 meter

$x = (\text{Length of Train} + \text{Length of bridge})/\text{Time} \dots\dots\dots(1)$

$$x = (400)/15$$

$$x = 80/3 \text{ m/s}$$

$$x = 80 \times 18/(5 \times 3) = 96 \text{ kmph}$$

8) Answer: D

Solution: According to the question,

Let length of Train = x meter.

Let length of platform = 300 meter.

Speed = $(\text{Length of Train} + \text{Length of platform})/\text{Time} \dots\dots\dots(1)$

When passing a man ,

$$\text{Speed} = (x)/10 \dots\dots\dots(1)$$

When passing platform,

$$\text{Speed} = (x + 300)/25 \dots\dots\dots(2)$$

Solving eq (1) & eq (2)

Length of Train = 200 meter

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9) Answer: A

Solution:

According to the question,

Speed of train = x m/s

Let length of Train = 160 units

Let length of bridge = 140 units

$x = (\text{Length of Train} + \text{Length of bridge})/\text{Time}$
.....(1)

$x = (300)/15$

$x = 20$ m/s

Speed in kmph = 72 kmph

10) Answer: A

Solution:

According to the question,

Let time = $1/6$ minutes = 10 seconds

Speed of train A = 20 m/s

Speed of train B = 25 m/s

Let length of Train A + Length of Train B = x meter

$(S_A + S_B) = (\text{Length of Train A} + \text{Length of Train B})/\text{Time}$ (1)

$20 + 25 = x/10$

$45 = x/10$

$x = 450$ meter

Total length of both trains = 450 meters

11) Answer: D

Solution:

According to the question,

Let time = $1/3$ minutes = 20 seconds

Speed of Truck = 54 kmph. = $54 \times 5/18 = 15$ m/s

Speed of train = 15 m/s

Let length of Train = L meter

$(S_A + S_B) = (\text{Length of Train} + \text{Length of Truck})/\text{Time}$
.....(1)

$15 + 15 = L/20$

$30 = L/20$

$L = 600$ meter

Length of Train = 600 meter

12) Answer: B

Solution:

According to the question,

Time = 33 seconds.

Speed of Bus = 36 kmph = $36 \times 5/18 = 10$ m/s

Speed of train = 15 m/s

Let length of Bus = $1x$ meter

Let length of Train = $10x$ meter

$(S_A + S_B) = (\text{Length of Train A} + \text{Length of Train B})/\text{Time}$ (1)

$(10 + 15) = (11x)/33$

$x = 75$ units

Length of Train = $10x = 750$ meter

13) Answer: D

Solution:

According to the question,

Let time = 20 seconds

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Speed of train A = 5x
Speed of train B = 4x
Length of slower train = 150 meter
(S_A + S_B) = (Length of Train A + Length of Train B)/Time(1)
4x + 5x = (200 + 150)/20
9x = (350)/20
x = 1.94 units
Speed of faster train = 5x = 9.72 m/s

14) Answer: C
Solution:
According to the question,
Let time = 48 seconds
Speed of train A = 2x
Speed of train B = x
Length of slower train = 100 meter
S_A + S_B = (Length of Train A + Length of Train B)/Time(1)
3x = (200 + 100)/48
3x = 300/48
x = 2.08 units
Speed of slower train = x = 2.08 m/s

15) Answer: B
Solution:
According to the question,
Speed of Train A = 45 kmph
Time taken = 6 hours

Distance = 45× 6 = 270 kms
Actual time taken = 9 hours.
Reduced speed = Distance/Time
Reduced speed = 30 kmph

16) Answer: A
Solution:
According to the question,
Speed of Train A = 36 kmph
Time taken = 5 hours
Distance = 36× 5 = 180 kms
Delayed by time = 30 minutes
Each stoppage = 2 minutes
Total stoppage = 30/2 = 15 stoppage
But , 15th stoppage will be at destination so we don't count it.
Actual stoppage = 14

17) Answer: B
Solution:

	A	B
Time	5	3
Speed	3	5

We know that,
Speed α (1/Time)(1)
So the ratio of speeds = 3 : 5

18) Answer: A
Solution:
According to the question,

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	A	B
Speed	3	4
Time	4	3
Time difference = 1 unit		
1 unit = 2 hours		
Time taken by A = 8 hours		
Time taken by B = 6 hours		
Distance = Speed × Time		
Distance = 48 km		
To cover Distance = (100 + 48) km		
Distance = 148 kms		
Time = 148/6		
Time = 24.6 hours		

19) Answer: C

Solution:

According to the question,

	A	B
Speed	3	2
Time	2	3

Time difference = 1 unit
1 unit = 1 hours
Time taken by A = 2 hours
Time taken by B = 3 hours
Distance = Speed × Time
Distance = 6 km
To cover total Distance = (2*6) km
Total distance = 12 kms

Time taken by B to cover total distance = 12/2
Time = 6 hours

20) Answer: D

Solution:

According to the question,

	A	B
Speed	30	45
Time	3	2

Time difference = 1 unit
1 unit = 1 hours
Time taken by A = 3 hours
Time taken by B = 2 hours
Distance = Speed× Time
Distance = 90 km
To cover Distance = (2×90 + 20) km
Distance = 200 kms

Time = 200/2
Time = 100 hours

21) Answer: A

Solution:

According to the question,
Speed of train = x m/s
Let length of Train = L units
x = (Length of Train)/Time(1)
x = L/10(2)
(5x + 25) = (L)(3)
From eq (2) & eq (3)

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$$x = 5 \text{ m/s}$$

$$\text{Speed of train} = 5 \times 18/5 = 18 \text{ kmph}$$

22) Answer: C

Solution:

According to the question,

$$\text{Speed of train} = 36 \times 5/18 = 10 \text{ m/s}$$

Let length of Train = x meter

Let length of platform = 200 meter

Train crosses signal in 20 sec, so

$$\text{Speed} = (\text{Length of Train} + \text{signal}) / \text{Time} \dots\dots\dots(1)$$

$$10 = x/20$$

$$X = 200\text{m}$$

Length of Train = 200 meter

23) Answer: A

Solution:

$$\text{Average speed} = \text{Total distance} / \text{Total time} \dots\dots\dots(1)$$

$$\text{Average speed} (40\% \text{ of } D + 60\% \text{ of } D + 50\% \text{ of } D + 25\% \text{ of } D) / (5 + 8 + 2 + 1)$$

$$\text{Average speed} = (175\% \text{ of } 400) / 16$$

$$\text{Average speed} = 43.75 \text{ kmph}$$

24) Answer: C

Solution:

$$\text{Average speed} = \text{Total distance} / \text{Total time} \dots\dots\dots(1)$$

$$\text{Average speed} = (126 + 130) / (12 + 8)$$

$$\text{Average speed} = 256/20$$

$$\text{Average speed} = 12.8 \text{ kmph}$$

25) Answer: B

Solution:

$$\text{Average speed} = \text{Total distance} / \text{Total time} \dots\dots\dots(1)$$

$$\text{Average speed} = (121 + 111 + 139) / (5 + 9 + 11)$$

$$\text{Average speed} = 371/25$$

$$\text{Average speed} = 14.8 \text{ kmph}$$

26) Answer: A

Solution:

According to the question,

Let Speed of Train A = x m/s

Speed of Train B = y m/s

$$(x + y) = (\text{Length of Train A} + \text{Length of Train B}) / \text{Time} \dots\dots\dots(1)$$

When travelling in opposite direction.

$$(x + y) = (300 + 200) / 20$$

$$x + y = 25 \text{ m/s} \dots\dots\dots(1)$$

When travelling in same direction.

$$(x - y) = (300 + 200) / 25$$

$$x - y = 20 \text{ m/s} \dots\dots\dots(2)$$

From eq (1) & eq (2)

$$x = 22.5 \text{ m/s}$$

27) Answer: D

Solution:

According to the question,

Let Speed of Train A = x m/s

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Speed of Train B = y m/s

$$(x + y) = (\text{Length of Train A} + \text{Length of Train B})/\text{Time} \\ \dots\dots\dots(1)$$

When travelling in opposite direction.

$$(x + y) = (350 + 250)/10$$

$$x + y = 60 \text{ m/s} \dots\dots\dots(1)$$

When travelling in same direction.

$$(x - y) = (350 + 250)/40$$

$$x - y = 15 \text{ m/s} \dots\dots\dots(2)$$

From eq (1) & eq (2)

$$y = 22.5 \text{ m/s}$$

28) Answer: A

Solution:

According to the question,

$$\text{Speed of train A} = 100/5 = 20 \text{ kmph}$$

$$\text{Speed of train B} = 80\% \text{ of speed of Train A} = 16 \text{ kmph.}$$

$$\text{Distance covered by Train B in one hour} = 16 \text{ kms}$$

29) Answer: C

Solution:

$$\text{Average speed of A \& B} = \text{Total distance/Total time} \\ \dots\dots\dots(1)$$

$$\text{Average speed of A \& B} = (100 + D)/(5 + 8)$$

$$25 = (100 + D)/(13)$$

$$D = 225 \text{ km}$$

$$\text{Speed of train B} = (3 \times 225)/8$$

$$\text{Speed of train B} = 84.375 \text{ kmph}$$

30) Answer: A

Solution:

$$\text{Average speed of A \& B} = \text{Total distance/Total time} \\ \dots\dots\dots(1)$$

$$\text{Average speed of A \& B} = (150 + D)/(7 + 9)$$

$$32.5 = (150 + D)/(16)$$

$$D = 370 \text{ km.}$$

$$\text{Speed of train B} = (370)/9$$

$$\text{Speed of train B} = 41.1 \text{ kmph}$$

31) Answer: D

Solution:

According to the question,

Let the time taken = t seconds.

$$\text{So the speed} = 9t \text{ m/s.}$$

$$\text{Speed} = \text{Distance covered/Time taken} \dots\dots\dots(1)$$

$$9t \times t = 22500$$

$$t = 50 \text{ seconds}$$

$$\text{Speed} = 450 \text{ m/s}$$

$$\text{Time} = \text{Distance/Speed}$$

$$\text{Time} = 360 \times 1000/450$$

$$\text{Time} = 13.33 \text{ minutes}$$

32) Answer: B

Solution:

According to the question,

$$\text{Speed of train} = x \text{ m/s}$$

Let length of Train = y meter

Let length of platform = $3y$ meter.

Let length of bridge = $6y$ meter.

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$$\text{Speed} = (\text{Length of Train} + \text{Length of Platform})/\text{Time} \dots\dots\dots(1)$$

$$\text{Speed} = (4y)/10$$

$$10x = 4y \dots\dots\dots(2)$$

$$x = (\text{Length of Train} + \text{Length of bridge})/\text{Time}$$

$$20x = 7y \dots\dots\dots(3)$$

In eq (2) and eq (3) both the variables gets cancelled. So the answer will be ‘Cannot be determined’

33) Answer: B

Solution:

According to the question,

Let the speed of train = y m/s

Length of Bridge = 300 meters

Length of train = x meters

Length of platform = 2x meters

Time taken to cross a Bridge = 20 seconds

Speed of Train = (length of Train + length of bridge)/Time taken(1)

$$\text{Speed of train} = (x + 300)/20$$

$$20y = x + 300 \dots\dots\dots(2)$$

To cross a platform,

$$10y = x \dots\dots\dots(3)$$

$$S = 30 \text{ m/s}$$

$$\text{Speed of Train} = 30 \text{ m/s.}$$

34) Answer: A

Solution:

According to the question,

Length of train = 360 meters.

Time taken to cross a pole = 1/10 minutes = 6 seconds.

Speed of Train = (length of Train)/Time taken

$$\text{Speed of Train} = 360/6 = 60 \text{ m/s}$$

$$\text{Speed of train} = 60 \times 18/5 = 216 \text{ kmph}$$

35) Answer: A

Solution:

According to the question

$$\text{Speed of train} = 36 \times 5/18 = 10 \text{ m/s}$$

Let length of Train = (L) meter

Let length of bridge = (2L) meter

$$(S) = (\text{Length of Train} + \text{Length of Platform})/\text{Time} \dots\dots\dots(1)$$

$$(10) = (3L)/30$$

$$L = 100 \text{ meter} \dots\dots\dots(2)$$

$$\text{Now speed} = 45 \text{ kmph} = 45 \times 5/18 = 12.5 \text{ m/s}$$

$$(S) = (\text{Length of Train} + \text{Length of bridge})/\text{Time}$$

$$12.5 = (100 + 200)/\text{Time taken}$$

$$\text{Time taken} = 24 \text{ sec}$$

36) Answer: C

Solution:

According to the question,

$$\text{Speed of train} = 18 \times 5/18 = 5 \text{ m/s.}$$

Let length of Train = (L) meter

Let length of platform = (L) meter.

$$(S) = (\text{Length of Train} + \text{Length of Platform})/\text{Time} \dots\dots\dots(1)$$

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$$(5) = (2L)/20$$

$$L = 50 \text{ meter} \dots\dots\dots(2)$$

$$\text{Now speed} = 36 \text{ kmph} = 36 \times 5/18 = 10 \text{ m/s.}$$

$$(S) = (\text{Length of Train} + \text{Length of bridge})/\text{Time}$$

$$10 = (100)/\text{Time taken}$$

$$\text{Time taken} = 10 \text{ sec.}$$

37) Answer: D

Solution:

According to the question,

$$\text{Let Distance} = 450 \text{ kms}$$

$$\text{Speed of Train A} = 60 \text{ kmph.}$$

$$\text{Speed of Train B} = 75 \text{ kmph.}$$

Train Q takes 1 minutes to cover 1 kms.

Lets assume that, Train Q will also leave at 8 : 30 so this will add 60 kms in the total distance.

$$\text{Total distance} = (450 + 60) \text{ kms}$$

$$(\text{Speed of P} + \text{Speed of Q}) = \text{Distance/Time taken} \dots\dots\dots(1)$$

$$(75 + 60) = (510)/\text{Time taken}$$

$$T = 3.77 \text{ hours}$$

38) Answer: B

Solution:

According to the question,

$$\text{Distance} = 750 \text{ kms}$$

$$\text{Speed of Train P} = 50 \text{ kmph.}$$

$$\text{Speed of Train Q} = 60 \text{ kmph.}$$

Train Q takes 1 minutes to cover 1 kms.

Lets assume that, Train Q will also leave at 8 : 00 so this will reduce 30 kms in the total distance.

$$\text{Total distance} = (750 - 30) \text{ kms}$$

$$(\text{Speed of P} + \text{Speed of Q}) = \text{Distance/Time taken} \dots\dots\dots(1)$$

$$(50 + 60) = (720)/\text{Time taken}$$

$$T = 6.54 \text{ hours}$$

39) Answer: A

Solution:

According to the question,

$$\text{Let Distance} = D \text{ kms.}$$

$$\text{Speed of Train A} = 50 \text{ kmph.}$$

$$\text{Speed of Train B} = 30 \text{ kmph.}$$

Train B takes 1 minutes to cover 1/2 kms.

Lets assume that, Train B will also leave at 10 : 00 so this will reduce 15 kms in the total distance.

$$\text{Total distance} = (D - 15) \text{ kms}$$

$$(\text{Speed of P} + \text{Speed of Q}) = \text{Distance/Time taken} \dots\dots\dots(1)$$

$$(50 + 30) = (D - 15)/4.25$$

$$D = 370 \text{ Kms.}$$

$$\text{Total distance} = (D - 15) = 355 \text{ kms}$$

40) Answer: B

Solution:

According to the question,

$$\text{Let Distance} = D \text{ kms.}$$

$$\text{Speed of Train P} = 50 \text{ kmph}$$

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Speed of Train Q = 30 kmph

Train Q takes 1 minutes to cover $1/2$ kms

Lets assume that, train Q will also leave at 6 : 00 so this will add 15 kms in the total distance.

Total distance = $(D + 15)$ kms

$(\text{Speed of P} + \text{Speed of Q}) = \text{Distance/Time taken} \dots\dots\dots(1)$

$$(50 + 30) = (D + 30)/3.5$$

$$D = 250 \text{ Kms.}$$

$$\text{Total distance} = (D + 15) = 265 \text{ kms.}$$

41) Answer: A

Solution:

According to the question,

Let the length of bridge = 200 meters.

Let the length of train = L meters.

Speed of Train = x m/s.

Speed of Train = $(\text{Length of Train} + \text{length of platform})/\text{Time} \dots\dots\dots(1)$

$$x = (L)/10$$

$$10x = L \dots\dots\dots(2)$$

Again from eq(1),

$$x = (200 + L)/15$$

$$15x = (200 + L) \dots\dots\dots(3)$$

From eq(2) & eq(3)

Length of bridge = 400 meter.

42) Answer: D

Solution:

According to the question,

Let T = Time taken to cross man.

Let length of Train A = 150 meter.

Length of Train B = 200 meter.

$(S_A + S_B) = (\text{Length of Train A} + \text{Length of Train B})/\text{Time} \dots\dots\dots(1)$

$$(20 + 15) = (350)/T$$

$$T = 10 \text{ Sec}$$

Time taken (T) = 10 Sec.

43) Answer: B

Solution: According to the question,

Distance of train from Man = 750 meters.

Let the length of train = 150 meters.

Speed of Man = 5 m/s.

Speed of Man = $(\text{Length of Train} + \text{length of platform})/\text{Time} \dots\dots\dots(1)$

$$5 = (900)/T$$

$$T = 180 \text{ Seconds.}$$

Time taken by Man to cross train = 180 seconds.

44) Answer: A

Solution: According to the question,

Let the length of platform = P meters.

Let the length of train = x meters.

Speed of Train = 36 kmph = $36 \times 5/18 = 20$ m/s.

Speed of Train = $(\text{Length of Train} + \text{length of platform})/\text{Time} \dots\dots\dots(1)$

Train crosses a signal in 10 seconds

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$$20 = (x)/10$$

$$x = 200 \text{ meter.}$$

The length of train = $x = 200$ meters.

Again from eq(1),

$$20 = (200 + P)/20$$

$$P = 200 \text{ meters}$$

The length of platform = $P = 200$ meters

45) Answer: B

Solution:

According to the question,

Let the length of platform = x meters

Let the length of train = $3x$ meters

Speed of Train = 20 m/s

Speed of Train = (Length of Train + length of platform)/Time(1)

$$20 = (3x + x)/40$$

$$x = 200 \text{ meter}$$

The length of platform = $x = 200$ meters

46) Answer: A

Solution:

According to the question,

Let the length of Basin = B meters.

Speed of Train = $36 \text{ kmph} = 36 \times 5/18 = 10 \text{ m/s.}$

Length of Train = 150 meter

Speed of Train = (Length of Train + length of platform)/Time(1)

$$10 = (150 + P)/50$$

$$P = 350 \text{ meter}$$

Length of River Basin = 350 m

47) Answer: C

Solution:

According to the question,

Initial speed of Train = $(S) \text{ m/s.}$

Let the length of Train = $(L) \text{ meters.}$

The length of Platform = 250 meters.

Speed of Train = (length of Train + length of Platform)/Time taken(1)

$$20S = (L + 250) \text{(2)}$$

To cross a signal,

$$15S = L \text{(3)}$$

From eq (2) & eq (3)

$$S = 50 \text{ m/s}$$

Speed in kmph = $50 \times 18/5 \text{ kmph}$

Speed in kmph = 180 kmph

48) Answer: A

Solution:

According to the question,

Speed of Train = $36 \times 5/18 = 10 \text{ m/s}$

Total Distance = $36 \times 6 = 216 \text{ kms}$

16.6% of distance = 36 kms

Remaining distance = 180 kms

Time taken to reach 16.6% distance = $36/36 = 1 \text{ hours}$

Delay time = 35 minutes

Total time consumed = $1 \text{ hours } 35 \text{ minutes}$

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Remaining time = 4 hours 25 minutes

Increased Speed = Distance/Time

Increased speed = $180/(4(25/60))$ kmph

Increased speed = 40.75 kmph

Percentage increased = $\{ (40.75 - 36)/36 \} \times 100$

Percentage increased = 13.19%

49) Answer: D

Solution:

According to the question,

Speed of Train = $20 \times 18/5 = 72$ kmph

Total Distance = $72 \times 6 = 432$ kms

50% of distance = 216 kms

Remaining distance = 216 kms

Time taken to reach 50% distance = $216/72 = 3$ hours

Delay time = 25 minutes

Total time consumed = 3 hours 25 minutes

Remaining time = 2 hours 35 minutes

Increased Speed = Distance/Time

Increased speed = $216/(2(35/60))$ kmph

Increased speed = 83.61 kmph

Percentage increased = $\{ (83.61 - 72)/72 \} \times 100$

Percentage increased = 16.125%

50) Answer: A

Solution:

According to the question,

Let the length of platform = P meters.

Speed of Train = 36 kmph = $36 \times 5/18 = 10$ m/s.

Length of Train = 150 meter.

Speed of Train = (Length of Train + length of platform)/Time(1)

$10 = (150 + P)/20$

P = 50 meter

Percentage

1) If 12.5% of a number is 12.5×1.25 , then find the 200% of that number?

- a) 2.5
- b) 1.25
- c) .75
- d) 1.75

2) 75% of a number is added to the number itself then the result is 35% of 200. Then find the number?

- a) 20

b) 30

c) 40

d) 50

3) x% of y is equal to z% of w, then find the value of 75% of X?

a) $4zw/3y$

b) $3zy/4$

c) $2zy/3y$

d) $zy/3$

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4) The price of a scooter is increased by 33.33% and then a discount of 6.75% is given at an increased price. What will be the effects on sale?

- a) 25% Increase
- b) 25% Decrease
- c) 20% Increase
- d) 20% Decrease

5) Find the successive percentage of 6.66% and 3.33%?

- a) 65/ 25%
- b) 63/9%
- c) 67/25%
- d) 92/9%

6) If 25% of $(A + B) = \frac{5}{2} \times (A - B)$, then find how many % A is more than B?

- a) 200/9%
- b) 100/9%
- c) 50/3%
- d) 75/3%

7) Find the percentage change in the area of the rectangle, whose length is decreased by 6.75 % and breadth is also decreased by 12.5% (rounded off two decimals)?

- a) Decreased by 16.66%
- b) Decreased by 18.40%
- c) Increased by 15%
- d) Increased by 12.06%

8) If 25% of X is added to 80% of X then the results becomes to 30% of 70 then find the value of 300 % of X?

- a) 50
- b) 40
- c) 60
- d) 80

9) Find the relation between X and Y, where 200% more than X = 75% less value of Y.

- a) $2X = 5Y$
- b) $3X = 5Y$
- c) $2X = 3Y$
- d) $12X = Y$

10) The yearly income of Mohan is Rupees 144000. He invested his monthly income in different parts of his lifestyles. 15% on his food, 10% on the cloth 12% on the other households, 18% on education and health. Rest of the total savings of income on life insurance policies. Then find how much money he saves monthly?

- a) 6400/-
- b) 5400/-
- c) 6000/-
- d) 4500/-

11) The income of X is 37.5% less than Y. Then the income of Y is how much percent more than that of X ?

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- a) 60% more than X
- b) 200/11% less than X
- c) 100/9% more than X
- d) 200/9% less than X

12) If the price of sugar is decreased by 62.5% then how much consumption of milk is increased to there is no change in the expense on it?

- a) 133.33%
- b) 16.666%
- c) 166.66%
- d) 13.333%

13) A dealer of kerosene oil is increased by 12.5% then decreased by 25% then again decreased by 20%. Find the overall change in its rate?

- a) It becomes 78.75%
- b) It becomes 67.5%
- c) It becomes 178.75%
- d) It becomes 168.75%

14) If the price of a washing machine is first increased to 22.5% and then decreased to 22.5%. Then in the price of the machine is changed to-

- a) Decreases by 5.0625 %
- b) Decreases by 6.0625%
- c) Increases by 5.0625%
- d) Increases by 6.0625%

15) In a hotel, 30% had coffee while 20% had tea. 10% of them had coffee and tea both. If 360 people

were present then find the number of people who did take either of two?

- a) 146
- b) 216
- c) 220
- d) 190

16) Income of Swathi is first decreased 12 % and then it is increased by 12%. What is the change in her income?

- a) 1.44%(decrease)
- b) 1.44 % (increase)
- c) 1.25 % (decrease)
- d) 1.25 % (increase)

17) Rashmi scored 32.5% marks and failed by 20 marks. Shyamali scored 37.5% marks and get 10 more marks than required to pass. Then find the maximum number of marks of the exam?

- a) 500
- b) 600
- c) 750
- d) 800

18) The Price of PPE kit includes the manufacturing cost, 12.75% is sales tax, 12.25% is profit. What is the manufacturing cost if the price is rupees 25670. Here sales and profit to be calculated on manufacturing cost.

- a) 52700/-

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b) 62700/-

c) 42700/-

d) 72700/-

19) A reduction of 27 % in the price of sanitizer enables us to buy 13.5 litres more for Rupees 100.

What is the reduced price per litre?

a) 3.4 Rupees per litre

b) 2.5 Rupees per litre

c) 2 Rupees per litre

d) 3.5 Rupees per litre

20) In an examination, A gets 20 % less marks than B. B gets 25% more marks than C and C gets 20 % less marks than D. If A gets 420 marks out of 600 then how much marks getting by D?

a) 58.33%

b) 66.66%

c) 33.33%

d) 58.66%

21) In an election, a candidate who gets 72% of the vote is elected by a majority of 880 votes. What is the number of polled votes?

a) 5000

b) 3000

c) 4000

d) 2000

22) Monthly income of Madhu is Rupees 12000. Monthly expenses of Madhu is on food is 22% of his

income. Remaining of the income spent on clothing is 20% and rest of the 30% on health and education and Gst of 20% on other households. Then find the monthly savings of Madhu ?

a) 40123/-

b) 41200/-

c) 4193.28/-

d) 40896/-

23) If successive % of x and y is M. Then find the value of M-x ?

a) $y(100 - x)/200$

b) $y(100 + 2x)/100$

c) $y(100 + x)/200$

d) $y(100 + x)/100$

24) There were 5 questions in an examination. 10% students have done all questions and 10% of students don't do any questions. Rest 20% of students do only one question and 20% of students do 4 questions. If out of 15% of students do 2 questions and 400 students do 3 questions then how many students do all questions?

a) 160

b) 120

c) 180

d) 200

25) A person purchases a plot for Rupees 34300 and builds a building with costing of Rupees 219700. If

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the value of the plot increases with 30% yearly where the price of building depreciated by 30% yearly then in how many years the price of both will be equal?

- a) 3 years
- b) 2 years
- c) 6 years
- d) 4 years

26) In a calculation, a number is multiplied by $\frac{7}{6}$ instead of $\frac{6}{7}$, what will be the percentage error in the solution?

- a) 25.25%
- b) 30.95%
- c) 30%
- d) 35.95%

27) In a cricket match, two batsmen Abhay and Ballu scored some runs. Difference between 20% of run scored by Abhay and 24% of runs scored by Ballu is equal to 40% of run scored by Ballu. Find the ratio of their runs.

- a) 16 : 5
- b) 16 : 7
- c) 8 : 5
- d) 8 : 7

28) Giving two successive discounts of 15% and 18% are given on the bag. Find out the overall discount in percentage to purchase the bag.

- a) 30.3%

b) 30%

c) 30%

d) 33.333%

29) In an area having a population of 2500, an election was held for the post of Panchayat leader. There were three candidates, and each one gets 10% more votes respectively. Due to some reason 183 votes were rejected. Find out the number of votes gotten by Panchayat leader?

- a) 784
- b) 748
- c) 847
- d) 874

30) Raza purchases an item by paying Rs.3363. He gets a discount of 5% on it. After getting the discount, he also pays GST of 18%. Find the Marked Price of the item Raza purchased.

- a) 3300
- b) 3000
- c) 4000
- d) 4300

31) A Shopkeeper sells some bananas. He sells 37.5% of bananas and still, he has 500 bananas left. Originally, he had:

- a) 750 bananas
- b) 850 bananas
- c) 872 bananas

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d) 800 bananas

32) If the cost price of any article increased by 22% and then after some time due to Diwali sale shopkeeper is offering a 22% discount. By what per cent percentage cost of the article has been increased or decreased?

- a) Decreased by 8.44%
- b) Increased by 8.44%
- c) Decreased by 4.84%
- d) Increased by 4.84%

33) In an examination the passing percentage is 35%. Sajal got 220 marks and failed by 25 marks. The maximum marks are:

- a) 650
- b) 700
- c) 750
- d) 800

34) What percentage of numbers from 1 to 20 has 7 or 3 in the unit's digit?

- a) 25%
- b) 20%
- c) 15%
- d) 4%

35) The population of Dholakpur was 2,20,000 three years ago. If it is increased by 4%, 5% and 5% respectively in the last three years, then the present population of city Dholakur is:

a) 252252

b) 262262

c) 222222

d) 242242

36) The ratio $1/5 : 1/4$ will be expressed in the form of percentage be :

- a) 125%
- b) 45%
- c) 54%
- d) 80%

37) If A is 60% of B, then how much per cent percent of 3A is B?

- a) 33.33%
- b) 44.44%
- c) 55.55%
- d) 66.66%

38) If the numerator of a fraction is increased by 20% and the denominator of the fraction is increased by 50%, the resultant fraction is $\frac{1}{2}$ what is the original fraction?

- a) $\frac{5}{8}$
- b) $\frac{5}{7}$
- c) $\frac{4}{6}$
- d) $\frac{7}{8}$

39) $33\frac{1}{3}\%$ of 69 + 28% of 25 = x% of 120. Find the value of X?

a) 30

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b) 25

c) 20

d) 15

40) Fresh peas have a 35% quantity of water, while dry peas contain 5% water. How many kgs of dry peas can be obtained by 50 kg of fresh peas?

a) 7.00 Kg

b) 7.14 Kg

c) 7.25 Kg

d) 7.50 Kg

41) How much is 60% of 180 is greater than $\frac{3}{5}$ of 30?

a) 90

b) 80

c) 100

d) 18

42) In an examination, 26% failed in Science and 29% failed in Mathematics. Find the pass percentage in both the subjects if 16% failed in both the subjects?

a) 51%

b) 61%

c) 71%

d) 76%

43) What will come in place of the question mark (?) in the following question?

$62.5\% \text{ of } 800 + 17\% \text{ of } 5500 = ? + 773$

a) 773

b) 772

c) 663

d) 662

44) If the given two numbers are respectively 14% and 35% of a third number, then what percentage is the first of the second?

a) 25%

b) 30%

c) 35%

d) 40%

45) 25% of one-seventh of a land is sold for Rupees 30,000. What is the value of 40% of the land?

a) 366000

b) 636000

c) 336000

d) 333000

46) Convert the fraction $\sqrt{49/2^3}$ into percentage

a) 75%

b) 37.5%

c) 87.5%

d) 80%

47) If $\frac{9}{10}$ th of $\frac{7}{4}$ th of a number is 1008, then 45% of that number is ____.

a) 144

b) 264

c) 288

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d) 298

48) When a number is increased by 11, it becomes 112.5% of itself. What is the number?

a) 77

b) 88

c) 112

d) 111

49) 30% discount is offered on an item. By using Membership card the customer wins 10% cashback. What is the effective discount percent?

a) 40%

b) 36%

c) 37%

d) 33%

50) If $x = 847$ and $y = 1111$, then x is how much percentage less than y ?

a) 20%

b) 24.67%

c) 23.2%

d) 23.76%

Percentage – Answers and Explanation

1) Answer: A

According to the question,

Let the required number be x

$$12.5\% \text{ of } x = 12.5 \times 1.25$$

$$\text{or, } 25x/2 = 25/2 \times 25/20$$

$$\text{or, } x = 25/20 = 5/4$$

$$\text{So, } 200\% \text{ of } 5/4 = 200/100 \times 5/4 = 10/4 = 2.5$$

Hence, the correct option is A.

2) Answer: C

Let the number be X .

According to the question,

$$75\%x + x = 35\% \times 200$$

$$\text{Or, } 3x/4 + x = 7/20 \times 200$$

$$\text{Or, } 7x/4 = 70$$

$$\text{Or, } x = 70 \times 4/7 = 40$$

Hence, the correct option is C.

3) Answer: A

As per the given data in question,

$$x\% \text{ of } y = z\% \text{ of } w$$

$$\text{Or, } x \times y/100 = zw/100$$

$$\text{Or, } x \times y = zw$$

$$\text{Or, } x = zw/y$$

Now,

$$75\% \times x = zw/y$$

$$\text{Or, } 3/4 \times x = zw/y$$

$$\text{Or, } x = 4zw/3y$$

Hence, the correct option is A.

4) Answer: A

According to the question,

$$X = 33.33\% = 100/3 \%, \text{ and } Y = 6.75\% = 25/4 \%$$

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By using the % change method = $(x - y - xy/100)$

$$= (100/3 - 25/4 - 100 \times 25/1200)$$

$$= (100/3 - 25/4 - 25/12)$$

$$= (400 - 75 - 25/12)$$

$$= 300/12 = 25\% \text{ (increase)}$$

Hence, the correct option is A.

5) Answer: D

As we know that successive percentage of a and b = $(a + b + ab/100)\%$

According to the given data in the question,

$$\text{Here, } a = 6.66\% = 100/15 = 20/3 \text{ and } b = 3.33\% = 10/3$$

Now,

$$(20/3 + 10/3 + 20 \times 10/900)\% = (20/3 + 10/3 + 2/9)\%$$

$$= 92/9\%$$

Hence, the correct option is D.

6) Answer: A

As per given data in the question,

$$25\% \text{ of } (A + B) = 5/2(A - B)$$

$$\text{Or, } 1/4 \times (A + B) = 5/2(A - B)$$

$$\text{Or, } A + B = 10(A - B)$$

$$\text{Or, } 11B = 9A$$

$$\text{Or, } A/B = 11/9$$

$$\text{So, Required \%} = (11 - 9) \times 100/9\% = 200/9\%$$

Hence, the correct option is A.

7) Answer: B

According to the question,

Successive change in % for a and b

$$= a + b + (ab/100)$$

Here,

$$a = -6.75\% \text{ and } b = -12.5\%$$

Now,

$$-6.75 - 12.5 + 6.75 \times 12.5/100$$

$$= -19.25 + 84.375/100$$

$$= -19.25000 + 0.84375$$

$$= -18.40625\% \text{ (Decrease)}$$

Hence, the correct option is B.

8) Answer: C

According to the question,

25% of X is added to the 80% of X then the result becomes to 30% of 70,

$$25\% \text{ of } x + 80\% \text{ of } x = 30\% \text{ of } 70$$

$$\text{Or, } x/4 + 4x/5 = 30 \times 300/100 = 21$$

$$\text{Or, } 5x + 16x/20 = 21$$

$$21x = 21 \times 20$$

$$\text{So, } x = 20$$

Now,

$$\text{Value of } 300\% \text{ of } 20 = 300 \times 20/100 = 60.$$

Hence, the correct option is C.

9) Answer: D

According to the question,

$$(200 + 100)\% \text{ of } X = (100 - 75)\% \text{ of } Y$$

$$\text{Or, } 300\% \text{ of } X = 25\% \text{ of } Y$$

$$\text{Or, } 300X = 25Y$$

$$\text{Or, } 12X = Y$$

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Hence, the correct option is D.

10) Answer: B

According to the education total investment of Mohan on all the things,

15% on his food + 10% on cloth + 12% on the other households + 18% on education and health
= 55%

Rest amount on the life insurance policy as a savings =
 $(100 - 55)\% = 45\%$

Now,

Yearly or 12 months income of Mohan = 144,000

So, monthly income = $144,000/12 = 12,000$

Therefore, monthly savings, $= 12,000 \times 45\% = 12,000 \times 9/20$
= 5400

Hence, the correct option is B.

11) Answer: A

According to the question,

Required percentage $= (x/(100-x)) \times 100$

$= (37.5/(100 - 37.5)) \times 100 = 60\%$ more than X

Hence, the correct option is A.

12) Answer: C

As we know that if x % decreases with changes in the price of any commodities then $x/(100 - x)$ % increases with changes its consumption then there was no effect on it.

So, Here $x = 62.5\%$

Required increases in % $= [62.5/(100 - 62.5)] \times 100$

$= (62.5 \times 100/37.5) = 166.66\%$

Hence, the correct option is C.

13) Answer: B

Let the basics, fixed price of kerosene = 100

According to the question,

Increased by 12.5% then decreased by 25% then again decreased by 20%,

$100 \times (1 + 25/200)(1 - 25/100)(1 - 20/100)$

$= 100 \times (9/8)(3/4)(4/5)$

$= 67.5\%$

Overall, it becomes 67.5% from 100%.

Hence, the correct option is A.

14) Answer: A

As we know that successive % of - a and b is $[-a + b - (a \times b)/100]$

According to the question,

Here, $a = +22.5$ & $b = -22.5$

Now,

$[22.5 - 22.5 - (22.5 \times 22.5)/100] \%$

$= (0 - 506.25/100)\%$

$= -5.0625\%$

Hence the correct option is A.

15) Answer: A

According to the question,

The number of persons who take only coffee(C) = 30% of 360 = 108

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The number of persons who take only tea (T) = 20 % of 360 = 72

The number of persons who take both coffee and tea (X) = 10% of 360 = 36

The number of persons who take either coffee or tea = C + T - X = 108 + 72 - 36 = 146

Hence, the correct option is A.

16) Answer: A

In such cases, there is always decrease.

Given that, $x = (\text{common increase or decrease}) = 12\%$

According to the formula

$$\begin{aligned}\text{Decrease percentage} &= x^2/100\% \\ &= 12^2/100\% \\ &= 1.44\%\end{aligned}$$

17) Answer: B

By the equating rule of, Passing marks or % is equal to Passing marks or % because in both of the cases full marks and pass mark are the same.

Let, Full marks = 100%,

So, Passing marks for Rashmi = Passing marks for Shyamali

$$32.5\% + 20 = 37.5\% - 10$$

$$\text{Or, } 5\% = 30$$

$$\text{Or, } 1\% = 6$$

$$\text{Or, } 100\% = 600.$$

Hence, the correct option is B.

18) Answer: B

According to the question,

Since, sales tax and profit can be calculated on manufacturing cost,

$$\text{Therefore single \% change} = 12.75\% + 12.25\% = 25\%,$$

Now,

$$\text{Manufacturing cost} \times (1 + 25\%)$$

$$\text{Manufacturing cost} \times 1.25 = 15675$$

$$\text{Manufacturing cost} = 15675 / 1.25 = 627 \times 100 = \text{Rs.} 62700$$

Hence, the correct option is B.

19) Answer: C

According to the question

Let, A person used to purchase x litre at price Rupees 100/- before reduction. Then after reduction, he gets 13.5 litres more in added with x litres for the same price is 100/-

Now,

A reduction of 27% in Rupees 100 that is Rupees 27/- enables him to buy 13.5 litres more.

Therefore, the reduced price is Rupees 27/- for 13.5 litres

So, the reduced price per litres = $27/13.5 = 2$ Rupees per litre.

Hence, The correct option is C.

20) Answer: A

Let the marks of C is 100.

According to the question,

B gets 25% more marks than C

$$B = (100 + 25) = 125$$

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A gets 20 % less marks than B

$$A = 125 \times (100 - 20) / 100 = 125 \times 80 / 100 = 100$$

And C gets 20 % less marks than D

$$D = 100 \times 100 / 80 = 125$$

Now,

$$\text{Ratio of marks of A: B: C: D} = 100: 125: 100: 125 = 4:$$

$$5: 4: 5$$

A gets 420 marks out of 600;

$$A = 4k \text{ and } A = 420; k = 420 / 4 = 70$$

$$\text{Therefore, } D = 5k = 5 \times 70 = 350$$

$$\% \text{ marks getting by D} = (\text{Marks obtained by D} / \text{Full marks}) \times 100$$

$$= 350 \times 100 / 600 = 58.33\%$$

Hence, the correct answer is A.

21) Answer: D

Let the total number of votes polled is x

Now, according to the question;

$$(100 - 72)\% \text{ of } x = 28\% \text{ of } x$$

$$\text{So, } 72\% \text{ of } x - 28\% \text{ of } x = 880$$

$$\text{Or, } 44\% \text{ of } x = 880$$

$$\text{Or, } x = 880 \times 100 / 44 = 2000$$

Number of polled votes is 2000

Hence, the correct option is D.

22) Answer: C

According to the question,

As we all know that if the concept of % in removing the % part from the whole and all times removing part of %

is on the base of always new % on rest value of remaining %

Then,

Monthly, savings of Madhu can be,

$$\text{Value} \times \{100 - a/100\} \times \{100 - b/100\} \times \{100 - c/100\} \times \{100 - d/100\}$$

$$= 12000 \times \{(100 - 22)/100\} \{(100 - 20)/100\} \{(100 - 30)/100\} \{(100 - 20)/100\}$$

$$= 12000 \times (78/100) \times (80/100) \times (70/100) \times (80/100)$$

$$= 12000 \times 78 \times 8 \times 7 \times 8 / 100 = \text{Rupees } 4193.28 \text{ /- is monthly savings of Madhu.}$$

Hence, the correct option is C.

23) Answer: D

According to the question,

The successive percentage value of x and y

$$X + y + xy/100 = M$$

$$\text{Or, } M - x - y = xy/100$$

$$\text{Or, } M - x = y + xy/100$$

$$\text{Or, } M - x = y(1 + x/100) = y(100 + x)/100$$

Hence, the correct option is D.

24) Answer: A

Number of students of total questions solved = 10%

Number of students who can't do any questions = 10%

$$\text{Remaining} = 100 - 10 - 10 = 80\%$$

Number of students who solve only one question = 20% of 80 = 16%

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Number of students who solve four questions = 30% of 80 = 24%

Remaining = $80 - 40 = 40\%$

Number of students who solve two questions = 15%

Number of students who solve three questions = $40 - 15 = 25\%$

According to the question,

$25\% = 400$

$25 \times 4\% = 400 \times 4$

Or, $100\% = 1600$

So, Number of students who solve total questions = $10\% \text{ of } 1600 = 160$

Hence, the correct option is A.

25) Answer: A

Let that the value of both will be equal in "t" years.

$34300(1 + 30/100)^t = 29700(1 - 30/100)^t$,

Or, $(13/10)^t \times (10/7)^t = (219700/34300)$

Or, $(13/7)^t = 2197/343 = 13 \times 13 \times 13 / 7 \times 7 \times 7 = (13/7)^3$

Or, $t = 3$ years.

Hence, the correct option is A.

26) Answer: B

Let the number = 100

As per the question,

$700/6 - 600/7 = (4900 - 3600)/42$

$= 1300/42 = 30.95\%$

Hence, the correct option is B.

27) Answer: A

Let the runs scored by Abhay = A and Ballu = B

According to the question,

$20\% \text{ of } A - 24\% \text{ of } B = 40\% \text{ of } B$

Or, $0.2A - 0.24B = 0.4B$

Or, $0.2A = 0.4B + 0.24B$

Or, $0.2A = 0.64B$

Or, $A/B = 64/20$

Or, $A : B = 16 : 5$

Hence, the correct option is A.

28) Answer: A

Total discount offered on the bag

$= (15 + 18 - (15 \times 18)/100)\%$

$= (33 - 2.7)\%$

$= 30.3\%$

Hence, the correct option is A.

29) Answer: C

Total number of voters = $2500 - 183 = 2317$

Let the third candidate got 100 votes

So, the second candidate got $100 + (10\% \text{ of } 100) = 110$ votes

So, first candidate (Panchayat leader) got $110 + (10\% \text{ of } 110) = 121$ votes

Total votes = $100 + 110 + 121 = 331$

$331 : 121 :: 2317$: Panchayat leader

Or, $331/2317 = 121/$ Panchayat leader

Panchayat leader = 847

Hence, the correct option is C.

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30) Answer: B

Let the Marked Price = 100

Cost after 5% discount = 95

Cost after 18% GST = $95 + (18\% \text{ of } 95) = 112.1$

As per the question,

$112.1 : 100 :: 3363 : \text{Marked Price}$

Marked price = $3363 \times 100 / 112.1 = 3000$.

Hence, the correct option is B.

31) Answer: D

Percentage of Left out bananas = $100\% - 37.5\% = 62.5\%$

As per the question,

$100 / 62.5 \times 500 = 800$ bananas

Hence, the correct option is D.

32) Answer: C

Let the original cost = 100

So,

$100 \times 122 / 100 \times 78 / 100 = 95.16$

Cost after Diwali offer = 95.16

i.e. $100 - 95.16 = 4.84$ less than the original

Hence, the correct option is C.

33) Answer: B

According to the question,

Maximum marks = $(220 + 25) \times 100 / 35 = 700$

Hence, the correct option is B.

34) Answer: B

According to the question,

Numbers having 3 or 7 in the unit digit = 3, 7, 13, 17

Percentage = $4 / 20 \times 100 = 20\%$

Hence, the correct option is B.

35) Answer: A

As we know that, if percentage population is increased by a %, b% and c % then present population can be find from last three years

$$= \frac{\text{Population before three years} \times (100+a)}{100} \times \frac{(100+b)}{100} \times \frac{(100+c)}{100}$$

So,

$220000 \times 104 / 100 \times 105 / 100 \times 105 / 100 = 252252$

Hence, the correct option is A.

36) Answer: D

According to the question,

$1/5 : 1/4 = 4/5 = (4/5) \times 100 = 80\%$

Hence, the correct option is D.

37) Answer: C

According to the question,

A = 60% of B

Or, $A = 60 / 100 \times B$

Or, $3A = 180 / 100 \times B$

Or, $(3A \times 100) / 180 = B$

Or, $B = 3A \times 100 / 180 \times 100\%$

Or, $B = 3A \times 55.55\%$

Hence, the correct option is C.

38) Answer: A

The original fraction is $1/2 \times (100+50) / (100+20)$

$= 1/2 \times 150 / 120 = 5/8$

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Hence, the correct option is A.

39) Answer: B

According to the question,

$$33 \frac{1}{3}\% \text{ of } 69 + 28\% \text{ of } 25 = x\% \text{ of } 120$$

$$\text{Or, } 100/3\% \times 69 + 28\% \times 25 = x\% \times 120$$

$$\text{Or, } 23+7 = x\% \times 120$$

$$\text{Or, } x=25$$

Hence, the correct option is B.

40) Answer: B

According to the question,

Let 'x' kgs of dry peas are obtained from the 50 kgs of fresh peas

$$\Rightarrow 50 \times 5/100 = 35x/100$$

$$\Rightarrow x = 7.14 \text{ kgs}$$

Hence, the correct option is B.

41) Answer: A

According to the question,

$$(60\% \text{ of } 180) - (3/5 \text{ of } 30)$$

$$= 108 - 18$$

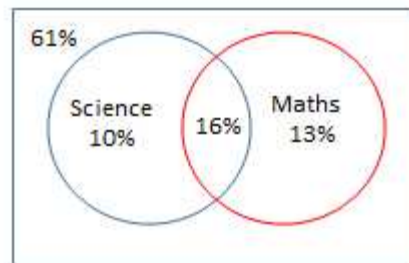
$$= 90$$

Hence, the correct option is A.

42) Answer: B

$$\text{Required \%} = 100 - (10+16+13) = 100-39 = 61\%$$

according to the below mentioned Venn diagram.



Hence, the correct option is B.

43) Answer: D

According to the question,

$$62.5\% \text{ of } 800 + 17\% \text{ of } 5500 = ? + 773$$

$$500 + 935 = ? + 773$$

$$? = 662$$

Hence, the correct option is D.

44) Answer: D

According to the question,

$$14/35 \times 100\% = 40\%$$

Hence, the correct option is D.

45) Answer: C

According to the question,

$$\text{Let the total land} = x$$

$$25/100 \times 1/7 \times x = 30000$$

$$\text{Or, } x = 8,40,000$$

$$\text{Hence, } 40\% \times 840000 = 336000$$

Hence, the correct option is C.

46) Answer: C

According to the question,

$$\sqrt{49/2^3} = 7/8 \times 100\% = 87.5\%$$

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Hence, the correct option is C.

47) Answer: C

According to the question,

$$9/10 \times 7/4x = 1008$$

$$\text{Or, } x = (1008 \times 10 \times 4)/(9 \times 7) = 640$$

So,

$$640 \times 45\% = 288$$

Hence, the correct option is C.

48) Answer: B

Let the number = x

According to the question,

$$12.5\% \text{ of } x = 11$$

$$\text{Or, } 12.5/100 \times x = 11$$

$$\text{Or, } x = 88$$

Hence, the correct option is B.

49) Answer: C

Let the Marked Price of item = 100

Cost after 30% discount = 70

Cash back = 10% of 7 = 7

Total discount = 30 + 7 = 37 or 37%

Hence, the correct option is C.

50) Answer: D

According to the question,

$$\text{Difference between y and x} = 1111 - 847 = 264$$

$$x \text{ is less than y} = (\text{difference}/y) \times 100\%$$

$$= 264/1111 \times 100 = 23.76\%$$

Hence, the correct option is D.

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