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PAPER 1

Q1. The multiplicative Inverse of -5/6 is

A. -5/6

C. 5/6

B. -6/5

D. 6/5

Q2. 75% of what number is 51?

A. 38.25

C. 100

B. 68

D. 136

Q3. Cost of 6 books is Rs. 968. The cost price of 3 books is _____.

A. Rs. 161.333

C. Rs. 484

B. Rs. 322.667

D. Rs. 4840

4. 32 - [36 - 2{5 × 2 + 7 - 6}] = _____.

A. -14

C. 14

B. 2

D. 18

Q5. What is the next term in the sequence 3, 7, 12, 18, 27, 33, _____.

A. 38

C. 40

B. 39

D. 42

Q6. The sale price of a book is Rs. 855 with a loss of 5%. What is the cost price of a book?

A. Rs. 870

C. Rs. 910

B. Rs. 900

D. Rs. 993

Q7. Abdullah gave Rs. 60 to Umar and Umar gave Rs. 90 to Ahmed. After this, all of them have same money. How much more Umar has than Ahmed?

A. Rs. 30

C. Rs. 90

B. Rs. 60

D. Rs. 120

Q8. The average of first ten whole numbers is _____.

A. 3.5

C. 4.5

B. 4.0

D. 5.5

Q9. What amount is invested in the bank to get a profit of Rs. 3500 at a rate of 7% for 4 years?

A. 10000

B. 12500

C. 15000 D. 16500

Q10. 9C = 9(F - 32) if C = 100 then value of F is

A. 349/9 C. 189

B. 149 D. 212

Q11. Pipe A can fill a tank in 2 hours, Pipe B can fill the tank in 1 hour 30 minutes and Pipe C can fill it in 2 hours 30 minutes. Which pipe(s) is/are more efficient?

A. Pipe A C. Pipe C

B. Pipe B D. Both A and C

Q12. The value of m in the ratio 3: m-3 = m-3: 12 is

A. -3, -9 C. 3, -9

B. -3, 9 D. 3, 9

Q13. The mode in the data 2, 3, 4, 9, 5, 6, 9, 8, 6, 5, 2, 9, 9 is

A. 2 C. 8

B. 5 D. 9

Q14. Find the number of diagonals that can be formed in a heptagon.

A. 07 C. 21

B. 14 D. 28

Q15. The median in the data 3, 10, 4, 5, 6, 7, 8, 3, 4 is

A. 4.5 C. 5.5

B. 5 D. 6

Q16. What is the angle between the hands of a clock at 9 o'clock?

A. 0° C. 90°

B. 60° D. 120°

Q17. In a scalene triangle

A. all angles are different in measure C. every angle is of 90°

B. all angles are same in measure D. two angles are same in measure

Q18. A dice is rolled twice. The probability of getting doublets is

A. 1/36 C. 1/9

B. 1/18 D. 1/6

Q19. The value of x in the linear equation (3x-4)/2 - (x/4) = (13/6) is

A. -50/3 C. 10/3

B. -10/3 D. 50/3

Q20. Find the quadratic equation whose roots are 1 and 2.

A. x^2 - 3x + 2 = 0

C. x^2 - 3x + 2 = 0

B. x^2 - 3x - 2 = 0

D. x^2 - 2x + 3 = 0

Q21. Simplify √36/√2

A. √3

C. 3

B. 3√2

D. 6

Q22. The ascending order of fractions 3/4, 4/5, 7/10 is

A. 7/10, 4/5, 3/4

C. 3/4, 7/10, 4/5

B. 7/10, 3/4, 4/5

D. 4/5, 3/4, 7/10

Q23. Ahmed has 95/9 liters of paint in a container. He pours 59/9 liters in a container and 35/12 liters in another. How much paint is left?

A. 7/36

C. 13/12

B. 11/36

D. 1/36

Q24. Factors of x^2 - 6x + 5 = 0 are

A. -1, -5

C. 1, -5

B. -1, 5

D. 1, 5

Q25. If f(x) = x^3 + 5kx - 70 and f(2) = 28 then value of k is

A. -9

C. 7

B. -7

D. 9

EXPLANATION

Q1. The multiplicative inverse of -5/6 is

The multiplicative inverse of a fraction a/b is b/a.

So, the multiplicative inverse of -5/6 is -6/5.

Q2. 75% of what number is 51?

75% of x = 51

(75/100)x = 51

0.75x = 51

x = 51 / 0.75

x = 68

Q3. Cost of 6 books is Rs. 968. The cost price of 3 books is _____.

Cost of 6 books = Rs. 968

Cost of 3 books = 968 / 2

= 484

Q4. 32 - [36 - 2{5 × 2 + 7 - 6}] = _____.

= 32 - [36 - 2(10 + 1)]

= 32 - [36 - 2 × 11]

= 32 - [36 - 22]

= 32 - 14

= 18

Q5. What is the next term in the sequence 3, 7, 12, 18, 27, ?

Differences: +4, +5, +6, +9

Assuming pattern continues:

27 + 11 = 38

Q6. The sale price of a book is Rs. 855 with a loss of 5%. What is the cost price of a book?

CP = SP × 100 / (100 - loss%)

= 855 × 100 / 95

= 900

Q8. The average of first ten whole numbers is _____.

Average = (0 + 9) / 2 = 4.5

Q9. What amount is invested in the bank to get a profit of Rs. 3500 at a rate of 7% for 4 years?

P = (100 × SI) / (R × T)

= (100 × 3500) / (7 × 4)

= 12500

Q10. 9C = 5(F - 32) if C = 100 then value of F is

9 × 100 = 5(F - 32)

900 = 5F - 160

5F = 1060

F = 212

Q11. Pipe A can fill a tank in 2 hours, Pipe B can fill the tank in 1 hour 30 minutes and Pipe C can fill it in 2 hours 30 minutes

Pipe A rate = 1/2 tank per hour

Pipe B rate = 1/1.5 = 2/3 tank per hour

Pipe C rate = 1/2.5 = 2/5 tank per hour

Comparing rates, Pipe B is most efficient.

Q12. The value of m in the ratio 3: m-3 = m-3: 12

3/(m-3) = (m-3)/12

36 = (m-3)^2

m-3 = ±6

m = 9 or m = -3

Q13. The mode in the data 2, 3, 4, 9, 5, 6, 9, 8, 6, 5, 2, 9, 9

The mode is the value that appears most frequently.

The value 9 appears 4 times.

Q14. Find the number of diagonals that can be formed in a heptagon.

A heptagon has 7 sides.

Number of diagonals = n(n-3)/2

= 7(7-3)/2

= 7 × 4 / 2

= 14

Q15. The median in the data 3, 10, 4, 5, 6, 7, 8, 3, 4

First, arrange the data in order: 3, 3, 4, 4, 5, 6, 7, 8, 10

The median is the middle value.

The median is 5.

Q16. What is the angle between the hands of a clock at 9 o'clock?

Angle = |30H - 11M/2|

= |30 × 9 - 0|

= 270° (or 90° since 270° is equivalent to 90° on the other side)

Q17. In a scalene triangle

A scalene triangle has all sides and angles different.

Q18. A dice is rolled twice. The probability of getting doublets

There are 6 possible doublets: (1,1), (2,2), (3,3), (4,4), (5,5), (6,6)

Total possible outcomes = 6 × 6 = 36

Probability = 6/36 = 1/6

Q19. The value of x in the linear equation (3x-4)/2 - (x/4) = (13/6)

Multiply both sides by 12 to eliminate fractions:

6(3x-4) - 3x = 26

18x - 24 - 3x = 26

15x = 50

x = 50/15

x = 10/3

Q20. Find the quadratic equation whose roots are 1 and 2.

x^2 - (sum of roots)x + (product of roots) = 0

= x^2 - (1 + 2)x + (1 × 2) = 0

= x^2 - 3x + 2 = 0

Q21. Simplify √36/√2

= √(36/2)

= √18

= √(9 × 2)

= 3√2

Q22. The ascending order of fractions 3/4, 4/5, 7/10

To compare, convert to equivalent decimals:

3/4 = 0.75

4/5 = 0.8

7/10 = 0.7

In ascending order: 0.7, 0.75, 0.8

Q23. Ahmed has 95/9 liters of paint in a container. He pours 59/9 liters in a container and 35/12 liters in another.

= 95/9 - 59/9 - 35/12

= 36/9 - 35/12

= 4 - 35/12

= (48 - 35)/12

= 13/12

Q24. Factors of x^2 - 6x + 5 = 0

x^2 - 6x + 5

= x^2 - 5x - x + 5

= x(x - 5) - 1(x - 5)

= (x - 1)(x - 5) = 0

Roots are 1 and 5.

Q25. If f(x) = x^3 + 5kx - 70 and f(2) = 28

f(2) = 2^3 + 5k(2) - 70 = 28

8 + 10k - 70 = 28

10k = 90

k = 9

PAPER 2

Q1. Simplification of $(\sqrt{2} + 2/\sqrt{3})(\sqrt{2} - 2/\sqrt{3})$ is _____.

A. 2/3
C. 14/9
B. 4/3
D. 8/3

Q2. If Umar takes Rs. 500 from Abdullah and Abdullah gives Rs. 1000 to Ahmed, after this all of them have equal amount of money. Find how much Umar has more than Ahmed.

A. Rs. 250
C. Rs. 2000
B. Rs. 500
D. Rs. 2500

Q3. Evaluate $78^2 + 4 + 312$.

A. 6084
C. 62
B. 6400
D. 7056

Q4. The angle between the hands of a clock at 6:50 is

A. 85°
C. 135°
B. 95°
D. 145°

Q5. If the sum of square of 10 values is 390 and the sum of same values is $10\sqrt{14}$, what is the value of standard deviation?

A. 3
C. 9
B. 5
D. 25

Q6. Pipe A can fill a tank in 10 minutes, while pipes B and C can empty the tank in 30 and 35 minutes, respectively. Initially the tank is empty, find the time it takes to fill the tank if all three pipes are opened simultaneously.

A. 105/2 minutes
C. 20 minutes
B. 105/4 minutes
D. 26 minutes

Q7. Simplify $15 + [2^2 - \{0.5(3 - 7) + 8\} - 3^3]$.

A. -29
C. 0
B. -14
D. 14

Q8. If $a + b = 5$, $a - b = \sqrt{29}$, then value of $2ab$ is _____.

A. -4
C. 27
B. -2
D. 54

Q9. The square root of $(x - 1/x)^2 + 4(x - 1/x) + 4$ is _____.

A. x - 1/x - 2

C. -x - 1/x + 2

B. -x + 1/x - 2

D. x + 1/x + 2

Q10. If f(x) represents a straight line, then range of function is _____ numbers.

A. natural

C. real

B. rational

D. whole

Q11. If f(x) = √x - 1 , then domain of function is _____.

A. (1,∞)

C. [1,∞]

B. [1,∞)

D. positive real numbers

Q12. The mode value in data 1, 2, 3, 4, 1, 4, 5, 3, 4, 2,1, 78, 1, 3, 1 is _____.

A. 1

C. 3, 4

B. 1, 3

D. 4, 5

Q13. How many times does the volume of sphere becomes if the radius is made three times?

A. 3

C. 9

B. 6

D. 27

Q14. The area of a square field is 360000 square units. The string required for fixing along the sides as a fence is _____ units.

A. 600

C. 2400

B. 1200

D. 5200

Q15. Simplification of 1/(x-y) + 1/(x+y) - 2x/(x^2+y^2) gives us _____.

A. 4xy^2/(x^4-y^4)

C. 4x^2y/(x^4-y^4)

B. 4xy/(x^4-y^4)

D. 4x^3y/(x-y)

Q16. Evaluate correct to 3 significant figure, the value of 52.97603-31.32186.

A. 21.7

C. 21.600

B. 21.654

D. 21.650

Q17. The value of median in data 98, 36, 24, 99, 83, 87, 29 is

A. 59.5

C. 85

B. 83

D. 87

Q18. The solution of the equations $x^2 + y^2 = 64$ and $x^2 - y^2 = 34$ is _____.

A. {(7,√15)}

C. {7,√15}

B. {(√15,7)}

D. {(7,15)}

Q19. If $\log_{\sqrt{6}} 216 = x$, then value of x is _____.

A. 1
C. 3
B. 2
D. 5

Q20. If 2x - 5x + 7/2 + 5/2 > -9, then value of x is _____.

A. x > -5
C. x > 5
B. x < -5
D. x < 5

Q21. The arithmetic mean of 15 values is 35. Upon checking, It was found that the data value 42 was incorrectly entered as 24. What is the corrected mean?

A. 31.2
C. 36.2
B. 34.2
D. 37.2

Q22. Which of the following is a triangular number?

A. 8
C. 12
B. 9
D. 15

Q23. The area of the triangle with measurements 5, 14, 13 is _____.

A. $\sqrt{66}$
C. $8\sqrt{33}$
B. $4\sqrt{66}$
D. 4

Q24. Sum of interior angles of hexagon is _____.

A. 180°
C. 540°
B. 360°
D. 720°

Q25. If 2x + 3y = 9 and xy = 2, then the value of $8x^3 + 27y^3$ is _____.

A. 324
C. 729
B. 405
D. 1053

Q26. Which of the following is a greatest number?

A. 0.8^4
C. 0.7^1/2
B. 0.9^5
D. 0.5^50

Q27. Two cars A and B are at 20 km apart. Car A is moving with a speed of 60 km/h towards car B, while car B is moving with a speed of 40 km/h moving away from car A. The distance between the two cars after 4 hours will be _____.

A. 60 km
C. 380 km
B. 100 km
D. 420 km

Q28. In a camp there were 50 persons having food sufficient for 5 days. After 2 days 15 more persons join the camp. For how many days the remaining food will be sufficient, if the quantity of the food taken by each person remains same.

A. 8 days

B. 10 days

C. 15 days

D. 18 days

Q29. Ahmed has three pieces of ribbon having lengths 25, 30 and 20 cm. He wants to cut these pieces in equal length with no piece remaining. Find the total number of pieces that he gets.

A. 22

B. 25

C. 47

D. 47

Q30. The surface area of the sphere is 55.44 cm^2. The diameter of the sphere is _____. (Take π= 22/7)

A. 1.4

B. 2.1

C. 2.8

D. 4.2

Q31. Evaluate (1- 1/5) × (1- 1/6) × ... × (1- 1/10).

A. 1/10

B. 1/5

C. 3/10

D. 2/5

Q32. Two years ago, the sum of ages of a mother and her daughter was 40 years. Find the present age of mother if 4 years ago, the age of mother was 8 times the age of her daughter.

A. 30 years

B. 32 years

C. 34 years

D. 36 years

EXPLANATION

Q1. Simplification of (√2 + 2/√3)(√2 - 2/√3) is __.

Using the formula (a + b)(a - b) = a^2 - b^2, we get:

= (√2)^2 - (2/√3)^2

= 2 - 4/3

= 2/3

Q2. If Umar takes Rs. 500 from Abdullah and Abdullah gives Rs. 1000 to Ahmed, after this all of them have equal amount of money. Find how much Umar has more than Ahmed.

The difference between Umar and Ahmed is 1000 - 500 = 500.

Umar has Rs. 500 more than Ahmed.

Q3. Evaluate 78^2 + 4 + 312

78^2 = 6084

6084 + 4 + 312 = 6400

Q4. The angle between the hands of a clock at 6:50 is

Use the formula |(30×H) - (11/2) ×M|

= |(30×6) - (11/2) ×50|

= |180 - 275|

= 95°

Q5. If the sum of square of 10 values is 390 and the sum of same values is

10√14, what is the value of standard deviation?

Use the shortcut formula: σ = √(Σx^2/n - (Σx/n)^2)

= √(390/10 - 14)

= √(39 - 14)

= √25

= 5

Q6. Pipe A can fill a tank in 10 minutes, while pipes B and C can empty the tank in 30 and 35 minutes, respectively. Initially the tank is empty, find the time it takes to fill the tank if all three pipes are opened simultaneously.

Formula for combined rate: 1/A - 1/B - 1/C = 1/T

1/10 - 1/30 - 1/35 = 1/T

(21 - 7 - 6)/210 = 1/T

8/210 = 1/T

T = 210/8 = 105/4 minutes

Q7. Simplify 15 + [2^2 - {0.5(3 - 7) + 8} - 3^3].

= 15 + [4 - {0.5(-4) + 8} - 27]

= 15 + [4 - 6 - 27]

= 15 - 29

= -14

Q8. If a + b = 5, a - b = √29, then value of 2ab is ___.

(a + b)^2 - (a - b)^2 = 4ab

25 - 29 = 4ab

2ab = -2

Q9. The square root of (x - 1/x)^2 + 4(x - 1/x) + 4 is __.

Let x - 1/x = t

t^2 + 4t + 4 = (t + 2)^2

So, the square root is t + 2 = x - 1/x + 2

Q10. If f(x) represents a straight line, then range of function is ___.

The range of a linear function is all real numbers.

Q11. If f(x) = √x - 1 , then domain of function is ___.

The expression under the square root must be non-negative.

x - 1 ≥ 0

x ≥ 1

So, the domain is [1, ∞).

Q12. The mode value in data 1, 2, 3, 4, 1, 4, 5, 3, 4, 2,1, 78, 1, 3, 1 is ___.

The frequency of each value is:

1: 4 times

2: 2 times

3: 3 times

4: 3 times

The value 1 appears most frequently.

Q13. How many times does the volume of sphere becomes if the radius is made three times?

The volume of a sphere is (4/3) × π × r^3.

If the radius is tripled, the new volume is (4/3) × π × $(3r)^3$

= 27 × (4/3) × π × r^3.

The volume becomes 27 times the original volume.

Q14. The area of a square field is 360000 square units. The string required for fixing along the sides as a fence is __ units.

The side length of the square is √360000 = 600 units.

The perimeter is 4 × 600 = 2400 units.

Q15. Simplification of 1/(x-y) + 1/(x+y) - 2x/(x²+y²) gives us ___.

Combine the fractions:

= (x+y+x-y)/(x²-y²) - 2x/(x²+y²)

= 2x/(x²-y²) - 2x/(x²+y²)

= 2x × (x²+y² - x² + y²) / (x⁴ - y⁴)

= 4xy² / (x⁴ - y⁴)

Q16. Evaluate correct to 3 significant figure, the value of 52.97603-31.32186.

52.97603 - 31.32186 = 21.65417

Rounded to 3 significant figures, the value is 21.7.

Q17. The value of median in data 98, 36, 24, 99, 83, 87, 29

Arrange the data in order: 24, 29, 36, 83, 87, 98, 99

The middle value is 83.

Q18. The solution of the equations x² + y² = 64 and x² - y² = 34 is __.

Add the two equations:

2x² = 98

x² = 49

x = ±7

Substitute x into one of the equations:

49 + y² = 64

y² = 15

y = ±√15

The solutions are (7, √15), (7, -√15), (-7, √15), and (-7, -√15).

Q19. If $\log_6\sqrt{}_6216 = x$, then value of x is ___.

$\log_6\sqrt{}_6216 = \log_6(6^3)^{(1/6)}$

$= \log_6(6^{(3/6)})$

$= \log_6(6^{(1/2)})$

= 1/2

Q20. If 2x - 5x + 7/2 + 5/2 > -9, then value of x is ___.

Combine like terms:

-3x + 6 > -9

-3x > -15

x < 5

Q21. The arithmetic mean of 15 values is 35. Upon checking, It was found that the data value 42 was incorrectly entered as 24. What is the corrected mean?

Corrected mean = Original mean + (Correct value - Incorrect value) / Total number of values

= 35 + (42 - 24) / 15

= 35 + 18 / 15

= 35 + 1.2

= 36.2

Q22. Which of the following is a triangular number?

A triangular number is a number that can be represented as the sum of consecutive integers, starting from 1.

The options are:

A. 8 = 1 + 7 (not consecutive)

B. 9 = 1 + 2 + 6 (not consecutive)

C. 12 = 1 + 2 + 3 + 6 (not consecutive)

D. 15 = 1 + 2 + 3 + 4 + 5 (consecutive)

Q23. The area of the triangle with measurements 5, 14, 13 is _____.

Using Heron's formula:

s = (5 + 14 + 13) / 2 = 16

Area = √(s(s-a)(s-b)(s-c))

$= \sqrt{(16 \times 11 \times 2 \times 3)}$

$= \sqrt{(1056)}$

$= 4\sqrt{66}$

Q24. Sum of interior angles of hexagon is _____.

The sum of interior angles of a polygon is (n-2) × 180°.

For a hexagon, n = 6.

Sum = (6-2) × 180°

= 720°

Q25. If 2x + 3y = 9 and xy = 2, then the value of $8x^3 + 27y^3$ is _____.

(2x + 3y)^3 = (9)^3

8x^3 + 27y^3 + 3 × 2x × 3y × (2x + 3y) = 729

8x^3 + 27y^3 + 18xy × 9 = 729

8x^3 + 27y^3 + 18 × 2 × 9 = 729

8x^3 + 27y^3 + 324 = 729

8x^3 + 27y^3 = 405

Q26. Which of the following is a greatest number?

Compare the options:

A. $0.8^4 = 0.4096$

B. $0.9^5 = 0.59049$

C. $0.7^{(1/2)} = 0.8366$

D. $0.5^{50} \approx 0$

Q27. Two cars A and B are at 20 km apart. Car A is moving with a speed of 60 km/h towards car B, while car B is moving with a speed of 40 km/h moving away from car A. The distance between the two cars after 4 hours will be _____.

Distance = Initial distance + Relative speed × Time

Relative speed = 60 + 40 = 100 km/h (since they are moving in opposite directions)

Distance = 20 + 100 × 4

= 20 + 400

= 420 km

Q28. In a camp there were 50 persons having food sufficient for 5 days. After 2 days 15 more persons join the camp. For how many days the remaining food will be sufficient, if the quantity of the food taken by each person remains same.

Remaining days = (Total food - Food consumed) / (New total persons × Food consumption rate)

Total food = 50 × 5 = 250 person-days

Food consumed in 2 days = 50 × 2 = 100 person-days

Remaining food = 250 - 100 = 150 person-days

New total persons = 50 + 15 = 65

Remaining days = 150 / 65

= 2.31 (approximately)

Q29. Ahmed has three pieces of ribbon having lengths 25, 30 and 20 cm. He wants to cut these pieces in equal length with no piece remaining. Find the total number of pieces that he gets.

Total number of pieces = (Length1 / GCD) + (Length2 / GCD) + (Length3 / GCD)

GCD = 5

Total number of pieces = (25/5) + (30/5) + (20/5)

= 5 + 6 + 4

= 15

Q30. The surface area of the sphere is 55.44 cm^2. The diameter of the sphere is _____. (Take π= 22/7)

Surface area = $4 \times \pi \times r^2$

$55.44 = 4 \times (22/7) \times r^2$

$r^2 = 55.44 \times 7 / (4 \times 22)$

$r^2 = 4.41$

$r = \sqrt{4.41}$

$r = 2.1$

Diameter = $2 \times r = 2 \times 2.1 = 4.2$

Q31. Evaluate (1- 1/5) × (1- 1/6) × … × (1- 1/10).

(4/5) × (5/6) × (6/7) × (7/8) × (8/9) × (9/10)

= 4/10

= 2/5

Q32. Two years ago, the sum of ages of a mother and her daughter was 40 years. Find the present age of mother if 4 years ago, the age of mother was 8 times the age of her daughter.

Let's denote the present age of mother as M and daughter as D.

M - 4 = 8(D - 4)

M = 8D - 28

(M - 2) + (D - 2) = 40

M + D = 44

Substitute M = 8D - 28

8D - 28 + D = 44

9D = 72

D = 8

M = 44 - 8 = 36

PAPER 3

Q1. Which of the following is a rational number?

A. π

B. 1.252729...

C. 7.323232...

D. √27

Q2. If $f(x) = 3x^4 - 2x^2 + 7$ then value of f(√2) is

A. 2

B. 3

C. √15

D. 15

Q3. The sale price of an article is Rs. 3597 with a profit of 9%. The cost price of article is

A. Rs. 310.50

B. Rs. 3197.33

C. Rs. 3250

D. Rs. 3300

Q4. The difference of face value from place value of 5 in 7956 is

A. -495

B. -45

C. 0

D. 45

Q5. Car A is moving with a speed of 50km/h towards car B which is moving away from car A with a speed of 90 km/h. What is the relative speed of two cars?

A. 40 kms
C. 90 kms
B. 70 kms
D. 140 kms

Q6. The sum of exterior angles of a regular octagon is

A. 30°
C. 360°
B. 45°
D. 1080°

Q7. The age of mother is 3 times the age of her daughter. Six years ago, the age of mother was 5 times the age of her daughter. The age of mother after two years will be

A. 32 years
C. 38 years
B. 36 years
D. 40 years

Q8. The number of 5-digit numbers, that can be formed from the digits 4, 3, 5, 7, 9 is

A. 60
C. 140
B. 120
D. 180

Q9. Two angles whose sum is 90° are called _____ angles.

A. complementary
C. obtuse
B. right
D. supplementary

Q10. $7\sqrt{2} - \sqrt{18}$ = _____

A. $2\sqrt{6}$
C. $4\sqrt{2}$
B. $2\sqrt{2}$
D. $3\sqrt{2}$

Q11. The equation $x^2 + y^2 = 1$ represents _____

A. parabola
C. circle
B. ellipse
D. hyperbola

Q12. $\log_2 2 \times \log_5 5 \times \log_3 3$ = _____

A. 0
C. 2
B. 1
D. 3

Q13. A man invests Rs. 10000 in the bank to get an interest of Rs. 2200 in five years. The rate of simple interest will be _____

A. 4.4%
C. 4.4%
B. 5%
D. 8%

Q14. Which of the following is a binary operation?

A. 4throot
C. Intersection
B. Cube
D. Square

Q15. What is the area of a pavement 2-meter wide which is drawn inside a rectangular park of dimensions 16 by 20?

A. 35 m^2

C. 128 m^2

B. 37 m^2

D. 160 m^2

Q16. The arithmetic mean of 15 numbers is 10. When two more values are added to the data the new arithmetic mean becomes 10. The value of two numbers is such that one number is 4 more than other.

A. 7, 11

C. 8, 12

B. 4, 16

D. 9, 13

Q17. The cost of 6 bats and 3 balls is Rs. 4500 and cost of 3 bats and 6 balls is Rs. 3600. The cost of one bat and a ball is

A. Rs. 300

C. Rs. 750

B. Rs. 600

D. Rs. 900

Q18. Pipe A can fill a tank in 45 minutes. If both pipes A and B are opened the tank is full in 15 minutes. In how much time tank will be full if pipe B is opened?

A. 20 minutes

C. 30 minutes

B. 22.5 minutes

D. 35.5 minutes

Q19. The sum of, sum and product of roots of equation $3x^2 - 7x + 15 = 0$ is

A. 8/3

C. 22/3

B. 5

D. 35/3

Q20. The cost price of 8 suits is Rs. 13400. What is the cost price of such 5 suits?

A. Rs. 8000

C. Rs. 8375

B. Rs. 8275

D. Rs. 8425

Q21. A boy travels 210 kms on a train in 3 hours. Then he travels 30 kms in one hour by bus. The average speed of boy for whole journey is _____.

A. 50 km/h

C. 60 km/h

B. 55 km/h

D. 70 km/h

Q22. The ratio between the length of square base of two pyramids is 3:7. What is the ratio between their volumes if the two pyramids are of equal height?

A. 3:7

C. 27:343

B. 9:49

D. 81:1728

Q23. What is the range in the data 2, 7, 9, 13, 2, 0, 3, -3, 7, 9, 87

A. 11

B. 13

C. 14 D. 90

Q24. The arithmetic mean of 2, 4, 5, 9 is _____.

A. 4 C. 7

B. 5 D. 10

Q25. The total surface area of a topless box having dimensions' length = 3, width = 6 and height = 10 is _____ Sq units.

A. 156 C. 198

B. 186 D. 216

Q26. Convert the ratio 21/30 into percentage.

A. 21% C. 70%

B. 42% D. 85%

Q27. Which of the following measures does NOT form a triangle?

A. 5, 9, 7 C. 7, 5, 12

B. 6, 6, 10 D. 15, 25, 34

Q28. 3 + [{50 - 10 x 2} ÷ 5(15 - 13)] + 5 =

A. 3 C. 10

B. 5 D. 11

Q29. The value of x in the equation x/5 - 3/2 = 5x/6 + 2/5 is _____.

A. -3 C. 3/2

B. -3/2 D. 3

Q30. What is the angle between the hands of clock at 10:30?

A. 85° C. 125°

B. 105° D. 135°

EXPLANATION

Q1. Which of the following is a rational number: π, 1.252729..., 7.323232..., √27 ?

Rational numbers are those that can be written in the form p/q where p and q are integers.

π is irrational.

1.252729… has no repeating pattern → irrational.

7.323232… is repeating → rational.

√27 = 3√3 is irrational.

Answer: 7.323232…

Q2. If f(x) = 3x^4 - 2x^2 + 7, find f(√2).

f(√2) = 3(√2)^4 - 2(√2)^2 + 7

(√2)^2 = 2, (√2)^4 = 4

f(√2) = 3(4) - 2(2) + 7 = 12 - 4 + 7 = 15

Answer: 15

Q3. The sale price of an article is Rs. 3597 with a profit of 9%. Find the cost price.

Formula: SP = CP × (1 + Profit%/100)

3597 = CP × 1.09

CP = 3597 / 1.09 = 3300

Answer: Rs. 3300

Q4. Find the difference between face value and place value of 5 in 7956.

Face value of 5 = 5

Place value of 5 = 5 × 10 = 50

Difference = 5 - 50 = -45

Answer: -45

Q5. Car A moves at 50 km/h towards Car B. Car B moves away from A with 90 km/h. Find their relative speed.

Relative speed (same direction) = |V2 - V1|

= |90 - 50| = 40 km/h

Answer: 40 km/h

Q6. Find the sum of exterior angles of a regular octagon.

Sum of exterior angles of any polygon = 360°

Answer: 360°

Q7. A mother's age is 3 times her daughter's age. Six years ago, the mother was 5 times her daughter. Find the mother's age after 2 years.

Let daughter's age = d, mother = 3d

Six years ago: 3d - 6 = 5(d - 6)

3d - 6 = 5d - 30

24 = 2d → d = 12

Mother now = 3 × 12 = 36

After 2 years = 36 + 2 = 38

Answer: 38 years

Q8. How many 5-digit numbers can be formed from the digits 4, 3, 5, 7, 9 (without repetition)?

We must arrange all 5 digits → 5!

5! = 5 × 4 × 3 × 2 × 1 = 120

Answer: 120

Q9. Two angles whose sum is 90° are called what?

Angles that sum to 90° are called complementary angles.

Answer: Complementary angles

Q10. Simplify: $7\sqrt{2} - \sqrt{18}$.

$\sqrt{18} = \sqrt{(9 \times 2)} = 3\sqrt{2}$

$7\sqrt{2} - 3\sqrt{2} = 4\sqrt{2}$

Answer: $4\sqrt{2}$

Q11. The equation x^2 + y^2 = 1 represents what curve?

x^2 + y^2 = 1 is a circle with center (0,0) and radius 1.

Answer: Circle

Q12. Evaluate: $\log_2(2) \times \log_5(5) \times \log_3(3)$.

Property: $\log_a(a) = 1$

So $1 \times 1 \times 1 = 1$

Answer: 1

Q13. A man invests Rs. 10000 and gets Rs. 2200 as simple interest in 5 years. Find the rate of interest.

Formula: SI = (P × R × T) / 100

2200 = (10000 × R × 5) / 100

2200 = 500R

R = 2200 / 500 = 4.4%

Answer: 4.4%

Q14. Which of the following is a binary operation: 4th root, cube, intersection, square?

Unary operation takes one input (cube, square, root).

Binary operation takes two inputs (intersection of two sets).

Answer: Intersection

Q15. A pavement of width 2 m is drawn inside a rectangular park of dimensions 16 m by 20 m. Find the area of the pavement.

Outer rectangle = 16 × 20

= 320 m^2

Inner rectangle = (16 - 4) × (20 - 4)

= 12 × 16 = 192 m^2

Pavement area = 320 – 192

= 128 m^2

Answer: 128 m^2

Q16. The arithmetic mean of 15 numbers is 10. When two more values are added to the data, the new arithmetic mean becomes 10. The value of two numbers is such that one number is 4 more than the other.

Mean × count = sum.

Sum of 15 numbers = 15 × 10

= 150.

Sum of 17 numbers = 17 × 10

= 170.

Sum of two added numbers = 170 – 150

= 20.

Let smaller = x, larger = x + 4.

x + (x + 4) = 20 → 2x + 4 = 20 → 2x = 16 → x = 8.

The two numbers are 8 and 12.

Answer: 8 and 12

Q17. The cost of 6 bats and 3 balls is Rs. 4500 and cost of 3 bats and 6 balls is Rs. 3600. Find the cost of one bat and one ball together.

Let

cost of bat = x,

cost of ball = y.

6x + 3y = 4500 → divide by 3 → 2x + y = 1500.

3x + 6y = 3600 → divide by 3 → x + 2y = 1200.

From 2x + y = 1500 ⇒ y = 1500 − 2x.

Substitute into x + 2y = 1200 ⇒ x + 2(1500 − 2x) = 1200.

x + 3000 − 4x = 1200 ⇒ −3x = −1800 ⇒ x = 600.

Then y = 1500 − 2(600) = 300.

Bat + ball = 600 + 300 = 900.

Answer: Rs. 900

Q18. Pipe A can fill a tank in 45 minutes. If both pipes A and B are opened the tank is full in 15 minutes. In how much time will the tank be full if pipe B is opened alone?

RateA = 1/45 tank/min.

Rate(A+B) = 1/15 tank/min.

RateB = Rate(A+B) – RateA

= 1/15 − 1/45

= (3−1)/45

= 2/45 tank/min.

TimeB = 1 / (2/45) = 45/2

= 22.5 minutes.

Answer: 22.5 minutes

Q19. Find the sum of roots and the product of roots of the equation $3x^2 - 7x + 15 = 0$.

For $ax^2 + bx + c = 0$, sum = $-b/a$, product = c/a.

Here $a = 3$, $b = -7$, $c = 15$.

Sum = $-(-7)/3 = 7/3$.

Product = $15/3 = 5$.

Answer: Sum = 7/3, Product = 5

Q20. The cost price of 8 suits is Rs. 13400. What is the cost price of 5 such suits?

Cost of 1 suit = $13400 \div 8$

$= 1675$.

Cost of 5 suits = 1675×5

$= 8375$.

Answer: Rs. 8375

Q21. A boy travels 210 kms on a train in 3 hours. Then he travels 30 kms in one hour by bus. The average speed of boy for whole journey is?

(shortcut: average = total distance / total time)

Total distance = 210 + 30

= 240 km.

Total time = 3 + 1

= 4 h.

Average speed = $240 \div 4$

= 60 km/h.

Answer: 60 km/h

Q22. The ratio between the length of square base of two pyramids is 3:7. What is the ratio between their volumes if the two pyramids are of equal height?

(shortcut: base area $\propto$ side^2, volume $\propto$ base area when height same):

Volume ratio = $3^2 : 7^2$

= 9 : 49.

Answer: 9 : 49

Q23. What is the range in the data 2, 7, 9, 13, 2, 0, 3, −3, 7, 9, 87?

(shortcut: range = max − min):

Max = 87, Min = −3.

Range = $87 - (-3) = 90$.

Answer: 90

Q24. The arithmetic mean of 2, 4, 5, 9 is?

Sum = 2 + 4 + 5 + 9 = 20.

Count = 4.

Mean = $20 \div 4 = 5$.

Answer: 5

Q25. The total surface area of a topless box having dimensions length = 3, width = 6 and height = 10 is?

(open-top box TSA = base + 2×(l×h) + 2×(w×h)):

Base area = l×w

= 3×6

= 18.

Two side walls area = 2×(l×h)

= 2×(3×10)

= 60.

Two other walls area = 2×(w×h)

= 2×(6×10)

= 120.

TSA (open top) = 18 + 60 + 120

= 198.

Answer: 198 sq units

Q26. Convert the ratio 21/30 into percentage.

(21/30) × 100

= 0.7 × 100

= 70%.

Answer: 70%

Q27. Which of the following measures does NOT form a triangle: (5, 9, 7), (6, 6, 10), (7, 5, 12), (15, 25, 34)?

(triangle inequality: sum of two smaller sides > largest):

(5,9,7): 5 + 7 = 12 > 9 → forms triangle.

(6,6,10): 6 + 6 = 12 > 10 → forms triangle.

(7,5,12): 7 + 5 = 12 = 12 → does NOT form (degenerate).

(15,25,34): 15 + 25 = 40 > 34 → forms triangle.

Answer: 7, 5, 12 (do not form a triangle)

Q28. Compute 3 + [{50 − 10 × 2} ÷ 5(15 − 13)] + 5.

(interpret ÷ 5(15−13) as division by [5×(15−13)]):

Compute inside: 50 − 10×2

= 50 – 20

= 30.

Denominator: 5 × (15 − 13)

= 5 × 2

= 10.

Fraction = 30 ÷ 10 = 3.

Expression = 3 + 3 + 5 = 11.

Answer: 11

Q29. Solve x/5 − 3/2 = 5x/6 + 2/5.

Multiply both sides by 30: 30·(x/5) − 30·(3/2)

= 30·(5x/6) + 30·(2/5).

Which gives: 6x − 45 = 25x + 12.

Bring x terms together: 6x − 25x = 12 + 45 → −19x = 57.

x = 57 / (−19) = −3.

Answer: x = −3

Q30. What is the angle between the hands of clock at 10:30?

(formula: angle = |30H − (11/2)M|):

H = 10, M = 30.

Angle = |30×10 − (11/2)×30|

= |300 − 165|

= 135°.

Answer: 135°

PAPER 4

Q1. A man covers some distance in 2 hours. Had he move slower by 4 km/h, he will cover the same distance in 6 hours. Find the speed of man.

A. 4.5 km/h

C. 9 km/h

B. 6 km/h

D. 13.5 km/h

Q2. The height of a tree was 4.8 m. After two years the height of the tree was increased by 12.5%. The new height of tree after one year is _____ if the height increased with same ratio.

A. 0.6 m

C. 5.4 m

B. 5.1 m

D. 6.0 m

Q3. $3\log_{10}5 + \log_{10}24 - 1/2\ \log_{10}9$ = _____.

A. 2

C. 100

B. 3

D. 1000

Q4 . The number of 5-digit numbers, that can be formed from the digits 4, 3, 5, 7, 9 is _____.

A. 60

C. 140

B. 120

D. 180

Q5. If the cost of 2 copies and 3 books is Rs. 1300 and cost 5 copies and 1 book is 2600. Find the cost of a copy and a book.

A. Rs. 100

C. Rs. 600

B. Rs. 500

D. Rs. 50000

Q6. Abdullah gave Rs. 150 to Umar and Umar take Rs. 65 to Ahmed. After this all of them have same money. How much more Abdullah has than Ahmed?

A. Rs. 30

C. Rs. 85

B. Rs. 35

D. Rs. 215

Q7. Ahmed added to containers of paint containing 40 liters and 55 liters of paint. After using 49 liters in room and 34 liters in kitchen, how much paint is left?

A. 7 liters

C. 21 liters

B. 12 liters

D. 22 liters

Q8. If f(x) = 5a then it is called _____ function.

A. constant
C. one-one
B. identity
D. quadratic

Q9. The quadratic equation with roots 2, -3 is

A. x^2 - x + 6
C. x^2 + x - 6 = 0
B. x^2 + x + 6 = 0
D. x^2 - x - 6 = 0

Q10. A certain number of balls were purchased for Rs. 750. Five more balls will be purchased with the same amount if price of each ball is less by Rs. 12.5. The original number of purchased balls is

A. 10
C. 20
B. 15
D. 50

Q11. If $f(x) = x^2 + 5kx - 70$ and f(-3) = -1 then value of k is

A. -62/15
C. 4
B. -4
D. 62/15

Q12. Abdullah gave Rs. 135 to Umar, and Umar takes Rs. 65 from Ahmed. After this all of them have same amount of money. How much Abdullah has more than Ahmed?

A. Rs.65
C. Rs.265
B. Rs.70
D. Rs.335

Q13. A man moves from town A to town B in 8 hours. Coming back from B to A he moves faster by 10 km/h and reach to town A in 7 hours. What is the distance from town A to B?

A. 56 km
C. 560 km
B. 420 km
D. 1120 km

Q14. If a + b = 10 and a - b = 4, then the value of $2(a^2 - b^2)$ is

A. 20
C. 60
B. 40
D. 80

Q15. If A:B = 5:7 and C:B = 7:11 then A:B:C = _____

A. 49:45:77
C. 55:77:49
B. 35:55:66
D. 49:55:77

Q16. $x = 8^{4/3}$, what is the value of x?

A. 4 3/4
B. 6

C. 10 2/3

D. 12

E. 16

Q17. What is the value of m^2 - 4mn + n when m = -1 and n = -3 .

A. -15

D. 8

B. -14

E. 10

C. -11

Q18. How many degrees are there in a Pie chart?

A. 90

D. 360

B. 60

E. 400

C. 180

Q19. The total weight of father and his son is 250 kg. If father's weight is 10 kg more than 3 times his son's weight. What is the weight of the son?

A. 40

D. 80

B. 50

E. 90

C. 60

Q20. In an examination 200 students failed in English and 800 failed in Physics. If total 900 students failed in any subject then how many failed in both?

A. 30

C. 50

B. 40

D. 100

Q21. Abdullah gave Rs. 60 to Umar and Umar gave Rs. 90 to Ahmed. After this, all of them have same money. How much more Umar has than Ahmed?

A. Rs. 30

C. Rs. 90

B. Rs. 60

D. Rs. 120

Q22. The average of first ten whole numbers is _____.

A. 3.5

C. 4.5

B. 4.0

D. 4.5

Q23. The mean score of ten students in a test is 49. If one more student is added, then the mean score of students become 50. Find the score of the last student.

A. 104

C. 60

B. 50

D. 62

Q24. What is the volume of the cone whose base radius is 3cm and slant height is 5cm?

A. 5π

B. 8π

C. 12π D. 15π

Q25. Ahmed travelled 400 km in 5 hours, then he cycles for 4 hours with a speed of 5km/h and walks for 1 hour with a speed of 2km/h. What is the average speed of Ahmed during the whole journey?

A. 29 km/h C. 42.2 km/h

B. 30 km/h D. 45 km/h

Q26. What amount is invested in the bank to get a profit of Rs. 3500 at a rate of 7% for 4 years?

A. 10000 C. 15000

B. 12500 D. 16500

Q27. The age of mother is 3 times the age of her daughter. Six years ago, the age of mother was 5 times the age of her daughter. The age of mother after two years will be:

A. 32 years C. 38 years

B. 36 years D. 40 years

Q28. A boy cycles for 4 hours with a speed of 6km/h and covers 9km by foot in 7 hours. The average speed of boy is _____

A. 3.0 km/h C. 7.3 km/h

B. 3.5 km/h D. 8.25 km/h

Q29. There were 20 boys and 10 girls in a class. What is the probability of selecting a girl or a boy as a monitor?

A. 1/30 C. 2/3

B. 1/3 D. 1

Q30. The arithmetic mean of 10 values is 50. If -27 is added to data. Then new arithmetic mean is _____

A. 23 C. 43

B. 38.5 D. 47.3

Q31. An amount of Rs. 19000 was invested at a rate of 6% for 4 years on simple interested basis. The total amount in the bank account after 4 years is _____

A. Rs. 22000 C. Rs. 23560

B. Rs. 23500 D. Rs. 80560

Q32. The age of father is 4 times the age of his son. 3 years ago, the age of father was 5 times the age of his son. The present age of father is _____

A. 10 years B. 24 years

C. 48 years

D. 60 years

EXPLANATION

Q1. A man covers some distance in 2 hours. Had he moved slower by 4 km/h, he would cover the same distance in 6 hours.

Let speed = v km/h

Distance = 2v

Distance = 6(v - 4)

2v = 6v - 24

-4v = -24

v = 6 km/h

Answer: 6 km/h

Q2. The height of a tree was 4.8 m. After two years the height of the tree was increased by 12.5%. The new height of tree after one year is _____ if the height increased with same ratio.

Two-year growth factor = 1.125 = 9/8

Annual growth factor = r

r^2 = 9/8

r = √(9/8)

= 3/√8

= 3√2/4

Height after 1 year = 4.8 × 3√2/4

Height = 3.6√2

Height ≈ 5.09 m

Answer: 5.09 m

Q3. $3\log_{10}(5) + \log_{10}(24) - 1/2\ \log_{10}(9)$

3log5 = log125

1/2 log9 = log3

Expression = log125 + log24 - log3

Expression = log((125 × 24)/3)

Expression = log1000

Expression = 3

Answer: 3

Q4. The number of 5-digit numbers, that can be formed from the digits 4, 3, 5, 7, 9 is _____.

Number = 5! = 120

Answer: 120

Q5. If the cost of 2 copies and 3 books is Rs. 1300 and cost 5 copies and 1 book is 2600. Find the cost of a copy and a book.

Let copy = x, book = y

2x + 3y = 1300

5x + y = 2600

15x + 3y = 7800

Subtract: 13x = 6500

x = 500

5(500) + y = 2600

2500 + y = 2600

y = 100

Answer: copy = Rs. 500, book = Rs. 100

Q6. Abdullah gave Rs. 150 to Umar and Umar gave Rs. 65 to Ahmed. After this all of them have same money. How much more Abdullah has than Ahmed?

A - 150 = U + 85 = H + 65

A - 150 = H + 65

A = H + 215

Difference = 215

Answer: Rs. 215

Q7. Ahmed added two containers of paint containing 40 liters and 55 liters of paint. After using 49 liters in room and 34 liters in kitchen, how much paint is left?

Total = 40 + 55 = 95

Used = 49 + 34 = 83

Remaining = 95 – 83

= 12

Answer: 12 liters

Q8. If f(x) = 5a then it is called _____ function.

f(x) is independent of x

Answer: constant function

Q9. The quadratic equation with roots 2, -3 is

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

x^2 + x - 6 = 0

Answer: x^2 + x - 6 = 0

Q10. A certain number of balls were purchased for Rs. 750. Five more balls will be purchased with the same amount if price of each ball is less by Rs. 12.5. The original number of purchased balls is

np = 750

(n + 5)(p - 12.5) = 750

p = 750/n

(n + 5)(750/n - 12.5) = 750

(n + 5)(750 - 12.5n) = 750n

750n - 12.5n^2 + 3750 - 62.5n = 750n

-12.5n^2 - 62.5n + 3750 = 0

n^2 + 5n - 300 = 0

n = (-5 ± 35) / 2

n = 15

Answer: 15 balls

Q11. If f(x) = x^2 + 5kx - 70 and f(-3) = -1 then value of k is

(-3)^2 + 5k(-3) - 70 = -1

9 - 15k - 70 = -1

-61 - 15k = -1

-15k = 60

k = -4

Answer: -4

Q12. Abdullah gave Rs. 135 to Umar, and Umar takes Rs. 65 from Ahmed. After this all of them have same amount of money. How much Abdullah has more than Ahmed?

A - 135 = U + 200 = H - 65

A - 135 = H - 65

A = H + 70

Difference = 70

Answer: Rs. 70

Q13. A man moves from town A to town B in 8 hours. Coming back from B to A he moves faster by 10 km/h and reach to town A in 7 hours. What is the distance from town A to B?

d = 8v

d = 7(v + 10)

8v = 7v + 70

v = 70

d = 8 × 70

= 560

Answer: 560 km

Q14. If a + b = 10 and a - b = 4, then the value of 2(a^2 - b^2) is

a^2 - b^2 = (a + b)(a - b)

a^2 - b^2 = 10 × 4 = 40

2(a^2 - b^2) = 80

Answer: 80

Q15. If A:B = 5:7 and C:B = 7:11 then A:B:C =

A:B = 55:77

C:B = 49:77

A:B:C = 55:77:49

Answer: 55:77:49

Q16. $x = 8^{(4/3)}$, what is the value of x?

8^(4/3) = (8^(1/3))^4

= 2^4

= 16

Answer: 16

Q17. What is the value of m^2 - 4mn + n when m = -1 and n = -3.

m^2 = 1

-4mn = -4 × (-1)(-3) = -12

n = -3

Expression = 1 - 12 - 3

= -14

Answer: -14

Q18. How many degrees are there in a Pie chart?

Pie chart = 360°

Answer: 360°

Q19. The total weight of father and his son is 250 kg. If father's weight is 10 kg more than 3 times his son's weight. What is the weight of the son?

s + (3s + 10) = 250

4s + 10 = 250

4s = 240

s = 60

Answer: 60 kg

Q20. In an examination 200 students failed in English and 800 failed in Physics. If total 900 students failed in any subject then how many failed in both?

200 + 800 - Both = 900

Both = 100

Answer: 100

Q21. Abdullah gave Rs. 60 to Umar and Umar gave Rs. 90 to Ahmed. After this, all of them have same money. How much more Umar has than Ahmed?

A - 60 = U - 30 = H + 90

U - 30 = H + 90

U = H + 120

Difference = 120

Answer: Rs. 120

Q22. The average of first ten whole numbers is _____.

Sum = 0 + 1 + ... + 9 = 45

Average = 45 / 10 = 4.5

Answer: 4.5

Q23. The mean score of ten students in a test is 49. If one more student is added, then the mean score of students become 50. Find the score of the last student.

Total for 10 = 10 × 49

= 490

Total for 11 = 11 × 50

= 550

Last = 550 - 490

= 60

Answer: 60

Q24. What is the volume of the cone whose base radius is 3cm and slant height is 5cm?

$h = \sqrt{(l^2 - r^2)}$

$= \sqrt{(25 - 9)}$

$= 4$

Volume = $1/3\ \pi\ r^2\ h$

$= 1/3\ \pi \times 9 \times 4$

$= 12\pi\ cm^3$

Answer: $12\pi\ cm^3$

Q25. Ahmed travelled 400 km in 5 hours, then he cycles for 4 hours with a speed of 5km/h and walks for 1 hour with a speed of 2km/h. What is the average speed of Ahmed during the whole journey?

Distance1 = 400

Distance2 = 20

Distance3 = 2

Total distance = 422

Total time = 10

Average speed = 422 / 10

= 42.2

Answer: 42.2 km/h

Q26. What amount is invested in the bank to get a profit of Rs. 3500 at a rate of 7% for 4 years?

I = P r t

3500 = P × 0.07 × 4

3500 = 0.28P

P = 12500

Answer: Rs. 12500

Q27. The age of mother is 3 times the age of her daughter. Six years ago, the age of mother was 5 times the age of her daughter. The age of mother after two years will be:

3d - 6 = 5(d - 6)

3d - 6 = 5d - 30

2d = 24

d = 12

Mother = 36

After 2 years = 38

Answer: 38 years

Q28. A boy cycles for 4 hours with a speed of 6km/h and covers 9km by foot in 7 hours. The average speed of boy is _____

Cycling = 24

Walking = 9

Total distance = 33

Total time = 11

Average speed = 3

Answer: 3 km/h

Q29. There were 20 boys and 10 girls in a class. What is the probability of selecting a girl or a boy as a monitor?

Total = 30

Favorable = 30

Probability = 30/30

= 1

Answer: 1

Q30. The arithmetic mean of 10 values is 50. If -27 is added to data. Then new arithmetic mean is _____

Total = 500

New total = 473

New mean = 473 / 11

= 43

Answer: 43

Q31. An amount of Rs. 19000 was invested at a rate of 6% for 4 years on simple interest basis. The total amount in the bank account after 4 years is _____

$I = 19000 \times 0.06 \times 4$

$= 4560$

Total = 19000 + 4560

= 23560

Answer: Rs. 23560

Q32. The age of father is 4 times the age of his son. 3 years ago, the age of father was 5 times the age of his son. The present age of father is _____

$4s - 3 = 5(s - 3)$

$4s - 3 = 5s - 15$

$s = 12$

Father = 48

Answer: 48 years

PAPER 5

Q1. [24 – 32 ÷ {41 – 25} – 2 x 8] + 3 = _____

A. -3

C. 6

B. 0

D. 9

Q2. If the cost of 2 copies and 3 books is Rs. 1300 and cost 5 copies and 1 book is 2600. Find the cost of a copy and a book.

A. Rs. 100

C. Rs. 600

B. Rs. 500

D. Rs. 50000

Q3. Abdullah gave Rs. 150 to Umar and Umar take Rs. 65 to Ahmed. After this all of them have same money. How much more Abdullah has than Ahmed?

A. Rs. 30

C. Rs. 85

B. Rs. 35

D. Rs. 215

Q4. Ahmed added to containers of paint containing 40 liters and 55 liters of paint. After using 49 liters in room and 34 liters in kitchen, how much paint is left?

A. 7 liters

C. 21 liters

B. 12 liters

D. 22 liters

Q5. If f(x) = 5a then it is called _____ function.

A. constant

C. one-one

B. identity

D. quadratic

Q6. The quadratic equation with roots 2, -3 is _____

A. $x^2 - x + 6$

C. $x^2 + x - 6 = 0$

B. $x^2 + x + 6 = 0$

D. $x^2 - x - 6 = 0$

Q7. . $3\log_{10}5 + \log_{10}24 - \frac{1}{2}\log_{10}9 =$

A. 2

C. 100

B. 3

D. 1000

Q8. $27^{3n+1}.81^{-n+2}/9^{n+5}.3^{3n-1}=$

A. 1

C. 9

B. 3

D. 27

Q9. Car A is moving with speed of 60 km/h and car B is moving with a speed of 80 km/h in the same direction. What is the distance between them after 3 hours if they started at the same point?

A. 20 km

C. 180 km

B. 60 km

D. 240 km

Q10. {38 - [35 - 2(5 + 7 - 6)]} ÷ 3 + 1 =

A. 4

C. 6

B. 5

D. 32

Q11. The roots of the equation $x^2 + x + 1 = 0$ are __. (Where w is a cube root of 1).

A. 1, w, w^2

C. 1, w^2

B. w, w^2

D. 1, w

Q12. Number 5 in 94.60572 is at _____ place.

A. hundredth

C. tenths

B. ones

D. thousandths

Q13. In a tournament 8 teams were playing. Each team has to play one match with every other team. The total number of matches that were played are _____.

A. 25

C. 56

B. 28

D. 64

Q14. A dice is rolled twice. The probability of getting a sum of 6 on dice is _____.

A. 1/36

C. 5/36

B. 1/18

D. 1/6

Q15. What is the angle between the hands of clock at 20 minutes to 8 O'clock?

A. 5°

C. 15°

B. 10°

D. 20°

Q16. There were 20 boys and 10 girls in a class. What is the probability of selecting a girl or a boy as a monitor?

A. 1/30

C. 2/3

B. 1/3

D. 1"

Q17. What is the next term in the sequence -2, 0, 18, 108, 486, _____.

A. 1856

C. 1924

B. 1890

D. 1944

Q18. The cost of a book is Rs. 750 with a profit of 12%. What is the sale price of 2 such books?

A. Rs. 700

C. Rs. 1680

B. Rs. 840

D. Rs. 1690

Q19. Pipe A can fill a tank in 2 hours, pipe B can fill the tank in 1 hour 30 minutes, a pipe C can fill it in 2 hours 30 minutes and pipe D can fill in 1 hour. What is the least time in which tank will be full only when two pipes are opened?

A. 18 minutes
C. 54 minutes
B. 36 minutes
D. 150 minutes

Q20. Ahmed and Fahad together have Rs. 1210. If 6/15 of Ahmed's amount is equal to 3/5 of Fahad's amount, how much amount does Ahmed have?

A. Rs. 450
C. Rs. 720
B. Rs. 484
D. Rs. 726

Q21. The sum of, sum and product of roots of the equation $3x^2 + 7x - 1 = 0$ is _____.

A. -8/3
C. 2
B. -2
D. 8/3

Q22. The sum of two numbers is 25 and their difference is 75 the ratio of two numbers is _____.

A. -1:2
C. 1:3
B. 1:2
D. 13:6

Q23. What is the next term in the sequence 1, 2, 4, 7, 11, 10, 22, 29?

A. 37
C. 41
B. 39
D. 57

Q24. What is the angle between the hands of a clock at 6 O'clock?

A. 90°
C. 150°
B. 120°
D. 180°

Q25. Sum of interior angles of octagon is

A. 540°
C. 900°
B. 720°
D. 1080°

Q26. 60% of what number is 270?

A. 200/9
C. 450
B. 162
D. 475

Q27. In 7096, the sum of place and face value of 7 is

A. 14
C. 7007
B. 77
D. 14000

Q28. 2x + 5y = -kx, if x = 2 and y = -1 then value of k is

A. -2

B. 1/2

C. 2

D. 3

3[

Q29. The range of the data 3, 5, 4, 6, 9, 17, 12, 15 is

A. 03

B. 05

C. 14

D. 20

Q30. Write the statement in the form of equation, "subtract 8 from 4 times a number to get -6".

A. -4x + 8 = 6

B. 4x - 8 = 6

C. -4x + 8 = -6

D. 4x - 6 = -8

Q31. The range of $f(x) = x^2 - 5/x + \sqrt{5}$ is

A. $\{\sqrt{5}\}$

B. real numbers - $\{-2\sqrt{5}\}$

C. real numbers - $\{\sqrt{5}\}$

D. real numbers - {0}

Q32. The amplitude of function 6sin(3x + 5) is _____.

A. -5/3

B. -5

C. 6

D. 2π

EXPLANATION

Q1. [24 – 32 ÷ {41 – 25} – 2 × 8] + 3 = ?

[24 – 32 ÷ {41 – 25} – 2 × 8] + 3

[24 – 32 ÷ {16} – 2 × 8] + 3

[24 – 2 – 16] + 3

[6] + 3

9

Answer: 9

Answer: 9**Q2. If the cost of 2 copies and 3 books is Rs. 1300 and cost of 5 copies and 1 book is Rs. 2600. Find the cost of a copy and a book.**

Let cost of a copy = c, cost of a book = b

2c + 3b = 1300

5c + b = 2600

b = 2600 – 5c

2c + 3(2600 – 5c) = 1300

2c + 7800 – 15c = 1300

–13c + 7800 = 1300

–13c = –6500

c = 500

b = 2600 – 5 × 500 = 100

Answer: Copy = Rs. 500, Book = Rs. 100

Q3. Abdullah gave Rs. 150 to Umar and Umar gave Rs. 65 to Ahmed. After this all of them have the same money. How much more Abdullah has than Ahmed?

Let Abdullah = A, Ahmed = H

A – 150 = H + 65

A – H = 215

Answer: Rs. 215

Q4. Ahmed added two containers of paint containing 40 liters and 55 liters of paint. After using 49 liters in a room and 34 liters in a kitchen, how much paint is left?

Total paint = 40 + 55 = 95

Used paint = 49 + 34 = 83

Remaining paint = 95 − 83

= 12

Answer: 12 liters

Q5. If f(x) = 5a then it is called _____ function.

f(x) = 5a is independent of x → constant function

Answer: Constant function

Q6. The quadratic equation with roots 2, −3 is _____

Quadratic formula: (x − r1)(x − r2) = 0

(x − 2)(x + 3) = 0

$x^2 + x - 6 = 0$

Answer: $x^2 + x - 6$

Q7. 3 log10(5) + log10(24) − 1/2 log10(9) = ?

3 log10 5 = log10 5^3 = log10 125

1/2 log10 9 = log10 √9 = log10 3

Expression = log10 125 + log10 24 − log10 3

Expression = log10 (125 × 24 / 3)

125 × 24 = 3000

3000 ÷ 3 = 1000

log10 1000 = 3

Answer: 3

Q8. 27^(3n+1)·81^(−n+2) ÷ (9^(n+5)·3^(3n−1)) = ?

27^(3n+1) = (3^3)^(3n+1) = 3^(9n+3)

81^(−n+2) = (3^4)^(−n+2) = 3^(−4n+8)

Numerator = 3^(9n+3)·3^(−4n+8) = 3^(5n+11)

9^(n+5) = (3^2)^(n+5) = 3^(2n+10)

Denominator = 3^(2n+10)·3^(3n−1) = 3^(5n+9)

Quotient = 3^(5n+11 − 5n−9) = 3^2 = 9

Answer: 9

Q9. Car A is moving with speed of 60 km/h and car B is moving with a speed of 80 km/h in the same direction. What is the distance between them after 3 hours if they started at the same point?

Distance between two objects moving in same direction = |v2 − v1| × time

Relative speed = 80 – 60

= 20 km/h

Distance = 20 × 3

= 60 km

Answer: 60 km

Q10. {38 − [35 − 2(5 + 7 − 6)]} ÷ 3 + 1 = ?

{38 − [35 − 2(5 + 7 − 6)]} ÷ 3 + 1

{38 − [35 − 2(6)]} ÷ 3 + 1

{38 − [35 − 12]} ÷ 3 + 1

{38 − 23} ÷ 3 + 1

15 ÷ 3 + 1

5 + 1

6

Answer: 6

Answer: 6**Q11. The roots of the equation $x^2 + x + 1 = 0$ are _____. (Where w is a cube root of 1)**

Quadratic equation: $x^2 + x + 1 = 0$

Discriminant $\Delta = b^2 - 4ac = 1 - 4 = -3$

Roots formula: $x = [-b \pm \sqrt{\Delta}] / 2a$

$x = [-1 \pm \sqrt{(-3)}] / 2$

$x = [-1 \pm i\sqrt{3}] / 2$

Also, cube roots of unity: $1 + w + w^2 = 0$

Therefore, roots = w, w^2

Answer: w, w^2

Q12. Number 5 in 94.60572 is at _____ place

Number = 94.60572

9 = tens place

4 = ones place

6 = tenths place

0 = hundredths place

5 = thousandths place

7 = ten-thousandths place

2 = hundred-thousandths place

Answer: 5 is at thousandths place

Q13. In a tournament 8 teams were playing. Each team has to play one match with every other team. The total number of matches that were played are _____.

Number of matches = $n(n - 1)/2$

Number of matches = $8 \times (8 - 1)/2$

Number of matches = $8 \times 7 / 2$

Number of matches = $56 / 2$

Number of matches = 28

Answer: 28

Q14. A dice is rolled twice. The probability of getting a sum of 6 on dice is _____.

Total outcomes = 6×6

Total outcomes = 36

Favorable outcomes = (1,5), (2,4), (3,3), (4,2), (5,1)

Favorable outcomes = 5

Probability = Favorable outcomes ÷ Total outcomes

Probability = $5 \div 36$

Answer: 5/36

Q15. What is the angle between the hands of clock at 20 minutes to 8 O'clock?

Minute hand angle = 40×6

Minute hand angle = 240°

Hour hand angle = $7 \times 30 + 40 \times 0.5$

Hour hand angle = $210 + 20$

Hour hand angle = 230°

Angle between hands = $|240 - 230|$

Angle between hands = 10°

Answer: 10°

Q16. There were 20 boys and 10 girls in a class. What is the probability of selecting a girl or a boy as a monitor?

Total students = $20 + 10$

Total students = 30

Probability = Number of favorable outcomes ÷ Total students

Probability = $30 \div 30$

Probability = 1

Answer: 1

Q17. What is the next term in the sequence −2, 0, 18, 108, 486, _____

Observe the pattern: each term multiplied by 3 (or sequence grows quickly)

$486 \times 4 = 1944$

Answer: 1944

Q18. The cost of a book is Rs. 750 with a profit of 12%. What is the sale price of 2 such books?

Profit for one book = 750 × 12/100

Profit for one book = 90

Sale price of one book = 750 + 90

Sale price of one book = 840

Sale price of 2 books = 840 × 2

Sale price of 2 books = 1680

Answer: Rs. 1680

Q19. Pipe A can fill a tank in 2 hours, pipe B in 1.5 hours, pipe C in 2.5 hours, pipe D in 1 hour. Least time to fill using 2 pipes?

Shortcut Formula:

Time = (Time of Pipe 1 × Time of Pipe 2) ÷ (Time of Pipe 1 + Time of Pipe 2)

So,

Pipe B = 1.5 h, Pipe D = 1 h

Time = (1.5 × 1) ÷ (1.5 + 1)

Time = 1.5 ÷ 2.5

Time = 0.6 hours = 36 minutes

Answer: 36 minutes

Q20. Ahmed and Fahad together have Rs. 1210. If 6/15 of Ahmed's amount = 3/5 of Fahad's amount, find Ahmed's amount.

Shortcut Formula:

A = (Total × Denominator of Ahmed fraction) ÷ (Denominator of Ahmed fraction + Denominator of Fahad fraction × Ratio)

Solution:

6/15 A = 3/5 F → Ratio = 2 (from 6A = 9F → 9/6 = 3/2 → 2)

A = (1210 × 15) ÷ (15 + 5 × 2)

A = 18150 ÷ 25

A = 726

Answer: Rs. 726

Q21. The sum of sum and product of roots of the equation $3x^2 + 7x - 1 = 0$ is _____

For quadratic $ax^2 + bx + c = 0$, sum of roots = $-b/a$, product of roots = c/a

Sum of roots = $-7 / 3$

Product of roots = $-1 / 3$

Sum + Product = $-7/3 + (-1/3)$

Sum + Product = $-8 / 3$

Answer: $-8/3$

Q22. The sum of two numbers is 25 and their difference is 75. The ratio of two numbers is _____

Let numbers be x and y

$x + y = 25$

$x - y = 75$

Adding:

$2x = 100$

$x = 50$

Subtracting:

$2y = -50$

$y = -25$

Ratio x : y = 50 : (−25)

Ratio x : y = −2 : 1

Answer: −2 : 1

Q23. What is the next term in the sequence 1, 2, 4, 7, 11, 10, 22, 29 ?

Observe differences: 2−1=1

4−2=2, 7−4=3, 11−7=4, 10−11=−1, 22−10=12, 29−22=7

Next term = 29 + 8 = 37

Answer: 37

Q24. What is the angle between the hands of a clock at 6 O'clock?

Hour hand = 6 × 30

Hour hand = 180°

Minute hand = 0 × 6

Minute hand = 0°

Angle = |180 − 0|

Angle = 180°

Answer: 180°

Q25. Sum of interior angles of octagon

Sum = (n − 2) × 180

Sum = (8 − 2) × 180

Sum = 6 × 180

Sum = 1080°

Answer: 1080°

Q26. 60% of what number is 270?

Let number = x

60% of x = 270

0.6 × x = 270

x = 270 ÷ 0.6

x = 450

Answer: 450

Q27. In 7096, the sum of place and face value of 7

Face value = 7

Place value = 7 × 1000

Place value = 7000

Sum = 7000 + 7

Sum = 7007

Answer: 7007

Q28. 2x + 5y = −kx, if x = 2, y = −1, find k

2(2) + 5(−1) = −k(2)

4 − 5 = −2k

−1 = −2k

k = 1/2

Answer: 1/2

Q29. The range of the data 3, 5, 4, 6, 9, 17, 12, 15

Maximum = 17

Minimum = 3

Range = 17 − 3

Range = 14

Answer: 14

Q30. Write the statement in the form of equation, "subtract 8 from 4 times a number to get −6"

Let number = x

4 × x − 8 = −6

4x − 8 = −6

Answer: 4x − 8 = −6

Q31. The range of $f(x) = x^2 - 5 / (x + \sqrt{5})$

f(x) undefined when denominator = 0

$x + \sqrt{5} = 0$

$x = -\sqrt{5}$

Range = all real numbers except value at $x = -\sqrt{5}$

Answer: $\mathbb{R} - \{\sqrt{5}\}$

Q32. The amplitude of function 6 sin(3x + 5)

Amplitude = |coefficient of sin|

Amplitude = |6|

Amplitude = 6

Answer: 6

PAPER 6

Q1. If x^3 - 2x^2 - 5x + 16 is divided by 2x - 6 then remainder is _____.

A. -14
C. 10
B. 0
D. 15

Q2. The sum of the place and face value of 6 in number 54689 is _____.

A. 0
C. 600
B. 594
D. 606

Q3. Ahmed has 95/3 liters of paint. After using 59/12 liters in room and 37/12 liters in kitchen, how much paint is left?

A. 7/12 liters
C. 71/6 liters
B. 5/3 liters
D. 71/3 liters

Q4. Sum of roots of 9x^2 + 21x - 8 = 0 is _____.

A. -7/3
C. 8/9
B. -8/9
D. 7/3

Q5. Pipe A can fill a tank in 45 minutes. If both pipes A and B are opened the tank is full in 15 minutes. In how much time tank will be full if pipe B is opened?

A. 20 minutes
C. 30 minutes
B. 22.5 minutes
D. 35.5 minutes

Q6. If a + b = 10 and a - b = 6, then the value of ab is

A. 16
C. 48
B. 32
D. 64

Q7. The value of m in the ratio 3: m - 7 = 9:12 is

A. -11
C. 3
B. -3
D. 11

Q8. The sale price of an article is Rs. 3597 with a profit of 9%. The cost price of article is

A. Rs. 310.50
C. Rs. 3250
B. Rs. 3197.33
D. Rs. 3300

Q9. The mean of 2, 2, 2, 2, 2, 2, 2 is

A. 0
B. 02

C. 10 D. 20

Q10. The graph of the function y = |3x - 9| has its wedge at

A. -9 C. 03

B. -3 D. 07

Q11. Which of the following is an irrational number?

A. 1.345345345... C. 18.3333333

B. √5 D. 35

Q12. The sale price of a T-shirt is Rs. 660 with a profit of 10%. The cost price of shirt is Rs. ____

A. 550 C. 620

B. 600 D. 700

Q13. The age of a father is 12 times the age of his son. After 5 years the age of father is 6 times the age of his son. The age of father after 3 years is ____

A. 40 years C. 50 years

B. 47 years D. 53 years

Q14. The cost price of 8 suits is Rs. 13400. What is the cost price of such 5 suits?

A. Rs. 8000 C. Rs. 8375

B. Rs. 8275 D. Rs. 8425

Q15. The sale price of an article is Rs. 3597 with a profit of 9%. The cost price of the article is _____.

A. Rs. 310.50 C. Rs. 3250

B. Rs. 3197.33 D. Rs. 3300

Q16. If f(x) = 5a then it is called _____ function.

A. constant C. one-one

B. identity D. quadratic

Q17. If tanA = 5/4 then cotB = _____.

A. 4/5 C. 4

B. 5/4 D. 5

Q18. A garrison has provision for 12 days for 1000 men. At the end of 2 days 200 more men were admitted. How long will the food now last?

A. 8 days C. 9 days

B. 8.33 days D. 9.33 days

Q19. Which of the following is an irrational number?

A. 1.345345345...
C. 18.3333333

B. √5
D. 35

Q20. 3/5 + 6/5 - 7/15 + 3/20 =

A. -49/60
C. 11/60

B. -7/60
D. 49/60

Q21. In a football league, 9 teams were playing. How many matches were played if every team had to play one match with every other team?

A. 20
C. 72

B. 36
D. 81

Q22. Sum of interior angles of octagon is _____.

A. 540°
C. 900°

B. 720°
D. 1080°

Q23. 60% of what number is 270?

A. 200/9
C. 450

B. 162
D. None

Q24. If 5x + 7y = 17 and 3x + 9y = 11 then value of x + 2y = _____.

A. -7
C. 7/2

B. -7/2
D. 7

Q25. The average of supplementary angles is _____.

A. 0°
C. 90°

B. 45°
D. 180°

Q26. The sum of first 20 natural numbers is _____.

A. 190
C. 210

B. 200
D. 220

Q27. Car A is moving with a speed of 110 km/h in the opposite direction of car B, which is moving with a speed of 50 km/h. What is their relative speed?

A. 50 km/h
C. 110 km/h

B. 60 km/h
D. 160 km/h

Q28. The sale price of shirt is Rs 336 with a loss of 8%. The cost price of shirt is _____.

A. Rs 350
C. Rs 450

B. Rs 365.22
D. Rs 480

Q29. A man covers some distance in 5 hours. If he moves faster by 4 km/h, he will cover the same distance in 3 hours. Find the distance covered by the man.

A. 15 km

C. 30 km

B. 24 km

D. 26 km

Q30. The sum of two-digits of a number is 9. If the digits are interchanged the new number so formed is 45 greater than the original number. The original number is

A. 27

C. 45

B. 36

D. 72

Q31. Sum of roots of the equation 7x^2 - 13x - 40 = 0 is

A. -40/7

C. 13/7

B. -13/7

D. 40/7

Q32. [24 - 32 ÷ {41 - 25} - 2 x 8] + 3 = _____.

A. -3

C. 6

B. 0

D. 9

Q33. Calculate the area of a right triangle, whose base length is 5cm and length of hypotenuse is 13cm.

A. 30 cm²

C. 60 cm²

B. 32.5 cm²

D. 65 cm²

EXPLANATION

Q1. If x^3 - 2x^2 - 5x + 16 is divided by 2x - 6 then remainder is ____

Remainder = f(b/a) for divisor ax-b

2x - 6 = 0, x = 3

$f(3) = 3^3 - 2\times3^2 - 5\times3 + 16$

f(3) = 27 - 18 - 15 + 16

f(3) = 10

Answer: 10

Q2. The sum of the place and face value of 6 in number 54689 is _____

Formula: Sum = Place value + Face value

Place value = 6 × 1000

= 6000

Face value = 6

Sum = 6000 + 6

Sum = 6006

Answer: 6006

Q3. Ahmed has 95/3 liters of paint. After using 59/12 liters in room and 37/12 liters in kitchen, how much paint is left?

Formula: Remaining = Total - Used

Used = 59/12 + 37/12

= 96/12

= 8

Remaining = 95/3 - 8

Remaining = 95/3 - 24/3

Remaining = 71/3

Answer: 71/3

Q4. Sum of roots of 9x^2 + 21x - 8 = 0 is _____

Formula: Sum of roots = -b/a

Sum = -21/9

Sum = -7/3

Answer: -7/3

Q5. Pipe A can fill a tank in 45 minutes. If both pipes A and B are opened the tank is full in 15 minutes. In how much time tank will be full if pipe B is opened?

Formula: 1/TA + 1/TB = 1/T(A+B)

1/45 + 1/TB = 1/15

1/TB = 1/15 - 1/45

1/TB = 2/45

TB = 22.5 minutes

Answer: 22.5

Q6. If a + b = 10 and a - b = 6, then the value of ab is

Formula: ab = a × b

a = (10 + 6)/2 = 8

b = (10 - 6)/2 = 2

ab = 8 × 2

ab = 16

Answer: 16

Q7. The value of m in the ratio 3: m - 7 = 9:12 is

Formula: 3/(m-7) = 9/12

3/(m-7) = 3/4

m - 7 = 4

m = 11

Answer: 11

Q8. The sale price of an article is Rs. 3597 with a profit of 9%. The cost price of article is

Formula: CP = SP / (1 + Profit%)

CP = 3597 / 1.09

CP = 3300

Answer: 3300

Q9. The mean of 2, 2, 2, 2, 2, 2, 2 is

Formula: Mean = Sum / n

Mean = (2 + 2 + 2 + 2 + 2 + 2 + 2)/7

Mean = 14/7

Mean = 2

Answer: 2

Q10. The graph of the function y = |3x - 9| has its wedge at

Formula: Wedge occurs when inside absolute = 0

3x - 9 = 0

x = 3

Answer: 3

Q11. Which of the following is an irrational number?

Formula: Irrational numbers cannot be expressed as fraction

√5 cannot be expressed as fraction

Answer: √5

Q12. The sale price of a T-shirt is Rs. 660 with a profit of 10%. The cost price of shirt is Rs. ____

Formula: CP = SP / (1 + Profit%)

CP = 660 / 1.1

CP = 600

Answer: 600

Q13. The age of a father is 12 times the age of his son. After 5 years the age of father is 6 times the age of his son. The age of father after 3 years is ____

Formula: F = 12S, F + 5 = 6(S + 5)

12S + 5 = 6(S + 5)

12S + 5 = 6S + 30

6S = 25

S = 25/6

F = 12S = 50

F + 3 = 53

Answer: 53

Q14. The cost price of 8 suits is Rs. 13400. What is the cost price of such 5 suits?

Formula:

CP of 1 suit = Total / 8

CP of 5 suits = 5 × CP of 1

CP of 1 = 13400 / 8

CP of 1 = 1675

CP of 5 = 1675 × 5

CP of 5 = 8375

Answer: 8375

Q15. If f(x) = 5a then it is called _____ function.

Formula: Constant function → same output for all x

Answer: Constant

Q16. If tanA = 5/4 then cotB = _____.

Formula: cotB = 1 / tanB

cotB = 4/5

Answer: 4/5

Q17. A garrison has provision for 12 days for 1000 men. At the end of 2 days 200 more men were admitted. How long will the food now last?

Formula: Remaining days = Remaining man-days / Remaining men

Total = 1000 × 12 = 12000

Used = 1000 × 2 = 2000

Remaining = 12000 - 2000 = 10000

Remaining men = 1000 + 200 = 1200

Days = 10000 / 1200

Days = 8.33

Answer: 8.33

Q18. Which of the following is an irrational number?

Answer: √5

Q19. 3/5 + 6/5 - 7/15 + 3/20 =

Formula: LCM method

LCM = 60

3/5 = 36/60, 6/5 = 72/60, -7/15 = -28/60, 3/20 = 9/60

Sum = 36 + 72 - 28 + 9

Sum = 89/60

Answer: 89/60

Q20. In a football league, 9 teams were playing. How many matches were played if every team had to play one match with every other team?

Formula: nC2 = n(n-1)/2

9 × 8 / 2 = 36

Answer: 36

Q21. Sum of interior angles of octagon is _____.

Formula: (n-2) × 180

(8-2) × 180 = 6 × 180

Sum = 1080°

Answer: 1080°

Q22. 60% of what number is 270?

Formula: x × 60/100 = 270 → x = 270 × 100 / 60

x = 270 × 100 / 60

x = 450

Answer: 450

Q23. If 5x + 7y = 17 and 3x + 9y = 11 then value of x + 2y = _____.

Formula: Elimination method

15x + 21y = 51

15x + 45y = 55

-24y = -4

y = 1/6

5x + 7 × 1/6 = 17

5x + 7/6 = 17

5x = 95/6

x = 19/6

x + 2y = 19/6 + 2/6 = 21/6

x + 2y = 7/2

Answer: 7/2

Q24. The average of supplementary angles is _____.

Formula: Average = Sum / 2

Average = 180 / 2

Average = 90°

Answer: 90°

Q25. The sum of first 20 natural numbers is _____.

Formula: n(n+1)/2

Sum = 20 × 21 / 2

Sum = 210

Answer: 210

Q26. Car A is moving with a speed of 110 km/h in the opposite direction of car B, which is moving with a speed of 50 km/h. What is their relative speed?

Formula: Relative speed = v1 + v2

Relative speed = 110 + 50

Relative speed = 160 km/h

Answer: 160

Q27. The sale price of shirt is Rs 336 with a loss of 8%. The cost price of shirt is ____.

Formula: CP = SP / (1 - Loss%)

CP = 336 / 0.92

CP = 365.22

Answer: 365.22

Q28. A man covers some distance in 5 hours. If he moves faster by 4 km/h, he will cover the same distance in 3 hours. Find the distance covered by the man.

Formula: Distance = Speed × Time

d/v = 5, d/(v+4) = 3

5v = 3(v + 4)

5v = 3v + 12

2v = 12

v = 6 km/h

Distance = 6 × 5

Distance = 30 km

Answer: 30 km

Q29. The sum of two-digits of a number is 9. If the digits are interchanged the new number so formed is 45 greater than the original number. The original number is

Formula: Let digits be x (tens) and y (units)

$x + y = 9$

$10y + x - (10x + y) = 45$

$10y + x - 10x - y = 45$

$9y - 9x = 45$

$y - x = 5$

$x + y = 9$

$x = 2, y = 7$

Original number = $10 \times 2 + 7$

Original number = 27

Answer: 27

Q30. Sum of roots of the equation $7x^2 - 13x - 40 = 0$ is

Formula: Sum of roots = $-b/a$

Sum = $-(-13)/7$

Sum = $13/7$

Answer: 13/7

Q31. $[24 - 32 \div \{41 - 25\} - 2 \times 8] + 3 =$ _____.

$41 - 25 = 16$

$32 \div 16 = 2$

$24 - 2 - 16 + 3 = 9$

Answer: 9

Q32. Calculate the area of a right triangle, whose base length is 5cm and length of hypotenuse is 13cm.

Area = 1/2 × base × height,

height = $\sqrt{(\text{hypotenuse}^2 - \text{base}^2)}$

Height = $\sqrt{(13^2 - 5^2)}$

Height = $\sqrt{(169 - 25)}$

Height = $\sqrt{144}$

Height = 12 cm

Area = $1/2 \times 5 \times 12$

Area = 30 cm^2

Answer: 30 cm^2