

1. Ray writes a two digit number. He sees that the number exceeds 4 times the sum of its digits by 3. If the number is increased by 18, the result is the same as the number formed by reversing the digits. Find the number.

- a) 35
- b) 42
- c) 49
- d) 57

Solution: Let the two digit number be xy .

$$4(x + y) + 3 = 10x + y \dots\dots(1)$$

$$10x + y + 18 = 10y + x \dots\dots(2)$$

Solving 1st equation we get $2x - y = 1 \dots\dots(3)$

Solving 2nd equation we get $y - x = 2 \dots\dots(4)$

Solving 3 and 4, we get $x = 3$ and $y = 5$

2. a, b, c are non negative integers such that $28a + 30b + 31c = 365$. $a + b + c = ?$

- a) Greater than 14
- b) less than or equal to 11
- c) 13
- d) 12

In a calendar,

Number of months having 28 days = 1

Number of months having 30 days = 4

Number of months having 31 days = 7

$$28 \times 1 + 30 \times 4 + 31 \times 7 = 365$$

Here, $a = 1, b = 4, c = 7$.

$$a + b + c = 12$$

3. George can do a piece of work in 8 hours. Paul can do the same work in 10 hours, Hari can do the same work in 12 hours. George, paul and hari start the same work at 9 am, while george stops at 11 am, the remaining two complete the work. What time will the work complete?

- a) 11.30 am
- b) 12 noon
- c) 12.30 pm
- d) 1 pm

Let the total work = 120 units.

As George completes this entire work in 8 hours, his capacity is 15 units /hour

Similarly, the capacity of paul is 12 units / hour

the capacity of Hari is 10 units / hour

All 3 started at 9 am and worked upto 11 am. So total work done upto 11 am = $2 \times (15 + 12 + 10) = 74$

Remaining work = $120 - 74 = 46$

Now this work is to be done by paul and hari. $46 / (12 + 10) = 2$ hours (approx)

So work gets completed at 1 pm

4. If x^y denotes x raised to the power y , Find last two digits of $(1141^{3843}) + (1961^{4181})$

- a) 02
- b) 82
- c) 42
- d) 22

Remember 1 raised to any power will give 1 as unit digit.

To find the digit in the 10th place, we have to multiply, 10th digit in the base \times unit digit in the power.

$$\begin{array}{c} \text{1141} \quad \text{3843} \\ \text{1141} \quad \text{3843} \end{array} + \begin{array}{c} \text{1961} \quad \text{4181} \\ \text{1961} \quad \text{4181} \end{array}$$

So the Last two digits of the given expression = $21 + 61 = 82$

5. J can dig a well in 16 days. P can dig a well in 24 days. J, P, H dig in 8 days. H alone can dig the well in How many days?

- a) 32

- b) 48
- c) 96
- d) 24

Assume the total work = 48 units.

Capacity of J = $48 / 16 = 3$ units / day

Capacity of P = $48 / 24 = 2$ units / day

Capacity of J, P, H = $48 / 8 = 6$ units / day

From the above capacity of H = $6 - 2 - 3 = 1$

So H takes $48 / 1$ days = 48 days to dig the well

6. If a lemon and apple together costs Rs.12, tomato and a lemon cost Rs.4 and an apple costs Rs.8 more than a lemon. What is the cost of lemon?

$$L + A = 12 \dots(1)$$

$$T + L = 4 \dots\dots(2)$$

$$L + 8 = A$$

Taking 1 and 3, we get $A = 10$ and $L = 2$

7. 3 mangoes and 4 apples costs Rs.85. 5 apples and 6 peaches costs 122. 6 mangoes and 2 peaches costs Rs.144. What is the combined price of 1 apple, 1 peach, and 1 mango.

- a) 37
- b) 39
- c) 35
- d) 36

Note: It is 114 not 144.

$$3m + 4a = 85 \dots(1)$$

$$5a + 6p = 122 \dots(2)$$

$$6m + 2p = 114 \dots(3)$$

$$(1) \times 2 \Rightarrow 6m + 8a = 170$$

$$(3) \Rightarrow 6m + 2p = 114$$

$$\text{Solving we get } 8a - 2p = 56 \dots(4)$$

$$(2) \Rightarrow 5a + 6p = 122$$

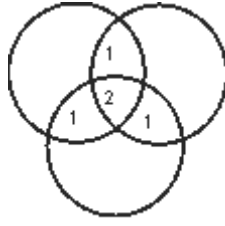
$$3 \times (4) = 24a - 6p = 168$$

$$\text{Solving we get } a = 10, p = 12, m = 15$$

$$\text{So } a + p + m = 37$$

8. An organisation has 3 committees, only 2 persons are members of all 3 committee but every pair of committee has 3 members in common. what is the least possible number of members on any one committee?

- a) 4
- b) 5
- c) 6
- d) 1



Total 4 members minimum required to serve only on one committee.

9. There are 5 sweets - Jammun, kaju, Peda, Ladu, Jilebi which can be consumed in 5 consecutive days. Monday to Friday. A person eats one sweet a day, based on the following constraints.

- (i) Ladu not eaten on monday
- (ii) If Jamun is eaten on Monday, Ladu should be eaten on friday.
- (iii) Peda is eaten the day following the day of eating Jilebi
- (iv) If Ladu eaten on tuesday, kaju should be eaten on monday

based on above, peda can be eaten on any day except

- a) tuesday
- b) monday
- c) wednesday
- d) friday

From the (iii) clue, peda must be eaten after jilebi. so Peda should not be eaten on monday.

10. If YWVSQ is 25 - 23 - 21 - 19 - 17, Then MKIGF

- a) 13 - 11 - 8 - 7 - 6
- b) 1 - 2-3-5-7
- c) 9 - 8 - 7 - 6 - 5
- d) 7 - 8 - 5 - 3

MKIGF = 13 - 11 - 9 - 7 - 6

Note: this is a dummy question. Dont answer these questions

11. Addition of $641 + 852 + 973 = 2456$ is incorrect. What is the largest digit that can be changed to make the addition correct?

- a) 5
- b) 6
- c) 4
- d) 7

641

852

963

2466

largest among tens place is 7, so 7 should be replaced by 6 to get 2456

12. Value of a scooter depreciates in such a way that its value at the end of each year is $\frac{3}{4}$ th of its value at the beginning of the same year. If the initial value of scooter is 40,000, what is the value of the scooter at the end of 3 years.

- a) 23125
- b) 19000
- c) 13435
- d) 16875

value of the scooter at the end of the year = $40000 \times \left(\frac{3}{4}\right)^3 = 16875$

13. At the end of 1994, R was half as old as his grandmother. The sum of the years in which they were born is 3844. How old R was at the end of 1999

- a) 48
- b) 55
- c) 49
- d) 53

In 1994, Assume the ages of GM and R = $2k, k$

then their birth years are $1994 - 2k, 1994 - k$.

But given that sum of these years is 3844.

$$\text{So } 1994 - 2k + 1994 - k = 3844$$

$$K = 48$$

$$\text{In 1999, the age of R is } 48 + 5 = 53$$

14. When numbers are written in base b , we have $12 \times 25 = 333$, the value of b is?

- a) 8
- b) 6
- c) None
- d) 7

Let the base = b

$$\begin{aligned} \text{So, } (b+2)(2b+5) &= 3b^2 + 3b + 3 \\ 2b^2 + 9b + 10 &= 3b^2 + 3b + 3 \\ b^2 - 6b - 7 &= 0 \end{aligned}$$

Solving we get $b = 7$ or -1

$$\text{So } b = 7$$

15. How many polynomials of degree ≥ 1 satisfy $f(x^2) = [f(x)]_2 = f(f(x))$

- a) more than 2
- b) 2
- c) 0
- d) 1

Let $f(x) = x^2$

$$f(x^2) = [x^2]_2 = x^4$$

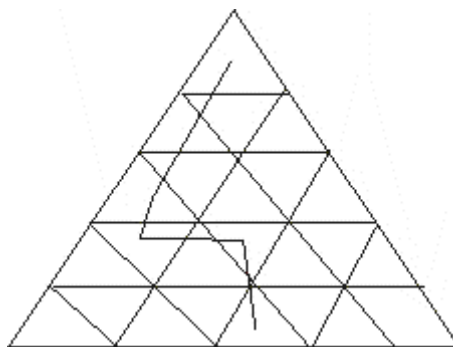
$$(f(x))_2 = [x^2]_2 = x^4$$

$$f(f(x)) = f(x^2) = [x^2]_2 = x^4$$

Only 1

16. Figure shows an equilateral triangle of side of length 5 which is divided into several unit triangles. A valid path is a path from the triangle in the top row to the middle triangle in the bottom row such that the adjacent triangles in our path share a common edge and the path never travels up (from a lower row to a higher row) or revisits a triangle. An example is given below. How many such valid paths are there?

- a) 120
- b) 16
- c) 23
- d) 24



Sol:

Number of valid paths = $(n-1)! = (5-1)! = 24$

17. In the question, A^B means, A raised to power B. If $x^2y^2z < 0$, then which one of the following statements must be true?

- (i) $xz < 0$ (ii) $z < 0$ (iii) $xyz < 0$
- a) (i) and (iii)

- b) (iii) only
- c) None
- d) (i) only

As y^2 is always positive, $x \cdot y^2 \cdot z < 0$ is possible only when $xz < 0$. Option d is correct.

18. The marked price of a coat was 40% less than the suggested retail price. Eesha purchased the coat for half the marked price at the fiftieth anniversary sale. What percentage less than the suggested retail price did Eesha pay?

- a) 60
- b) 20
- c) 70
- d) 30

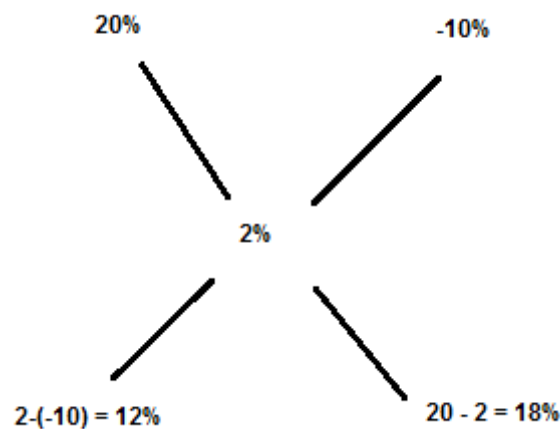
Let the retail price is Rs.100. then market price is $(100-40) \% \text{ of } 100 = 60$. Eesha purchased the coat for half of this price. ie., 30 only. which is 70 less than the retail price. So Option C is correct.

19. A cow and horse are bought for Rs.2,00,000. The cow is sold at a profit of 20% and the horse is sold at a loss of 10%. The overall gain is Rs.4000, the Cost price of cow?

- a) 130000
- b) 80000
- c) 70000
- d) 120000

Ans: Overall profit = $4000/200000 \times 100 = 2\%$

By applying alligation rule, we get



So cost price of the cow = $2/5 \times 200000 = 80,000$

20. A circle has 29 points arranged in a clock wise manner from 0 to 28. A bug moves clockwise manner from 0 to 28. A bug moves clockwise on the circle according to following rule. If it is at a point i on the circle, it moves clockwise in 1 sec by $(1 + r)$ places, where r is the remainder (possibly 0) when i is divided by 11. If it starts in 23rd position, at what position will it be after 2012 sec.

Ans: After 1st second, it moves $1 + (23/11)r = 1 + 1 = 2$, So 25th position

After 2nd second, it moves $1 + 25/11 = 1 + 3 = 4$, So 29th position = 0

After 3rd second, it moves $1 + 0/11 = 1 + 0 = 1$, So 1st position

After 4th second, it moves $1 + 1 = 3$ rd position

after 5th, $1 + 3/11 = 4$ So 7th

After 6th, $1 + 7/11 = 8$ so 15th

After 7th, $1 + 15/11 = 5$ so 20th

After 8th, $1 + 20/11 = 10$ th, So 30th = 1st

So it is on 1st after every $3 + 5n$ seconds. So it is on 1st position after 2008 seconds ($3 + 5 \times 401$) So on 20th after 2012 position.

21. In a city 100% votes are registered, in which 60% vote for congress and 40% vote for BJP. There is a person A, who gets 75% of congress votes and 8% of BJP votes. How many votes got by A?

Assume total votes are 100. So A got

75% of 60 = 45

8% of 40 = 3.2

A total of 48.2 %

22. Mean of 3 numbers is 10 more than the least of the numbers and 15 less than greatest of the 3. If the median of 3 numbers is 5, Find the sum of the 3 numbers?

Ans: Median is when the given numbers are arranged in ascending order, the middle one. Let the numbers are $x, 5, y$ where x is the least and y is greatest.

Given that $x+5+y=3x+10$

and $x+5+y=3y-15$

Solving we get $x = 0$ and $y = 25$.

So sum of the numbers = $0 + 5 + 25 = 30$

23. A and B start from house at 10am. They travel from their house on the MG road at 20kmph and 40 kmph. there is a Junction T on their path. A turns left at T junction at 12:00 noon, B reaches T earlier, and turns right. Both of them continue to travel till 2pm. What is the distance between A and B at 2 pm.

Distance between House and T junction = $20 \times 2 = 40$.

ie., B reached T at 11 am.

B continued to right after 11 am and travelled upto 2. So distance covered by him = $3 \times 40 = 120$

A reached T at 12 noon and travelled upto 2 So distance travelled by him = $2 \times 20 = 40$

So total distance between them = $120 + 40 = 160$ km

24. In a particular year, the month of january had exactly 4 thursdays, and 4 sundays. On which day of the week did january 1st occur in the year.

a) monday

b) tuesday

c) wednesday

d) thursday

Ans: If a month has 31 days, and it starts with sunday, Then Sundays, Mondays, tuesdays are 5 for that month. If this month starts with monday, then mondays, tuesdays, and wednesdays are 5 and remaining days are 4 each. so this month start with Monday.

25. A, E, F, and G ran a race.

A said "I did not finish 1st /4th

E said "I did not finish 4th"

F said "I finished 1st"

G said "I finished 4th"

If there were no ties and exactly 3 children told the truth, when who finishes 4th?

a) A

b) E

c) F

d) G

Ans: Option D

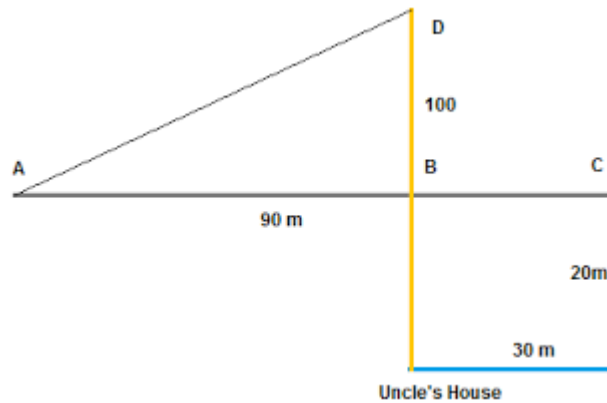
26. A child was looking for his father. He went 90 m in the east before turning to his right. he went 20 m before turning to his right again to look for his father at his uncle's place 30 m from this point. His father was not there. From there he went 100m north before meeting his father in a street. How far did the son meet his father from the starting point.

a) 90

b) 30

c) 80

d) 100



From the diagram, $AB = 90 - 30 = 60$ and $BD = 100 - 20 = 80$
 $AD = \sqrt{AB^2 + BD^2} = \sqrt{60^2 + 80^2} = 100$

27. In an office, at various times during the day the boss gives the secretary a letter to type, each time putting the letter on top of the pile in the secretary's inbox. Secretary takes the top letter and types it. Boss delivers in the order 1, 2, 3, 4, 5 which cannot be the order in which secretary types?

- a) 2, 4, 3, 5, 1
- b) 4, 5, 2, 3, 1
- c) 3, 2, 4, 1, 5
- d) 1, 2, 3, 4, 5

Ans: Option B

28. At 12.00 hours, J starts to walk from his house at 6 kmph. At 13.30, P follows him from J's house on his bicycle at 8 kmph. When will J be 3 km behind P?

By the time P starts J is $1.5 \text{ hr} \times 6 = 9 \text{ km}$ away from his house.

J is 3 km behind when P is 3 km ahead of him. i.e., P has to cover 12 km. So he takes $12 / (8 - 6) = 6 \text{ hrs}$ after 13.30. So the required time is 19.30Hrs

29. J is faster than P. J and P each walk 24 km. Sum of the speeds of J and P is 7 kmph. Sum of time taken by them is 14 hours. Then J speed is equal to

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

Given $J > P$

$J + P = 7$, only options are (6, 1), (5, 2), (4, 3)

From the given options, If $J = 4$ the $P = 3$. Times taken by them = $24/4 + 24/3 = 14$

30. In a G6 summit held at london. A french, a german, an italian, a british, a spanish, a polish diplomat represent their respective countries.

- (i) Polish sits immediately next to british
 - (ii) German sits immediately next to italian, British or both
 - (iii) French does not sit immediately next to italian
 - (iv) If spanish sits immediately next to polish, spanish does not sit immediately next to Italian
- Which of the following does not violate the stated conditions?

- a) FPBISG
- b) FGIPBS
- c) FGISPB
- d) FSPBGI
- e) FBGSIP

Ans: Option D

32. Raj drives slowly along the perimeter of a rectangular park at 24 kmph and completes one full round in 4 min. If the ratio of length to breadth of the park is 3 : 2, what are the dimensions?

- a) 450 m x 300 m
- b) 150 m x 100 m
- c) 480 m x 320 m
- d) 100 m x 100 m

$$24 \text{ kmph} = 24 \times \frac{1000}{60} = 400 \text{ m / min}$$

$$\text{In 4 minutes he covered } 4 \times 400 = 1600 \text{ m}$$

$$\text{This is equal to the perimeter } 2(l + b) = 1600$$

$$\text{But } l : b = 3 : 2$$

$$\text{Let } l = 3k, b = 2k$$

$$\text{Substituting, we get } 2(3k + 2k) = 1600 \Rightarrow k = 180$$

$$\text{So dimensions are } 480 \times 320$$

33. M is 30% of Q, Q is 20% of P and N is 50% of P. What is M / N

ans: Take P = 100, then N = 50, Q = 20, M = 6. So M/N = 3/25

34. At what time between 6 and 7 are the hands of the clock coincide?

$$\text{Ans. Total} = 360^\circ$$

$$\text{For hour} = 360/12 = 30^\circ/\text{hr}$$

$$\text{For Minute} = \text{full rotation} = 360^\circ/\text{hr}$$

$$\text{Let the time is 't', for 6} = 6 \times 30 = 180^\circ$$

then

$$30t + 180 = 360t$$

$$330t = 180$$

$$t = 180/330$$

$$t = 6/11 \text{ hr } 6/11 \times 60 = 360/11 = 32\frac{8}{11}$$

$$\text{Ans. is } 6:32$$

35. Series 1, 4, 2, 8, 6, 24, 22, 88 ?

Sol : The given series is in the format: $\times 4, -2, \times 4, -2, \times 4, -2, \times 4, \dots$

$$1 \times 4 = 4$$

$$4 - 2 = 2$$

$$2 \times 4 = 8$$

$$8 - 2 = 6$$

$$6 \times 4 = 24$$

$$24 - 2 = 22$$

$$22 \times 4 = 88$$

$$88 - 2 = 86$$

$$\text{Ans: } 86$$

36. 4 Women & 6 men have to be seated in a row given that no two women can sit together. How many different arrangements are there.

Sol : Let us first sit all the 6 men in 6! ways. Now there are 7 gaps between them in which 4 women can sit in 7P_4 ways.

$$\text{So total ways are } 6! \times {}^7P_4$$

37. $x^y + y^x = 46$ Find x & y values ?

$$\text{Sol: } 1^{45} + 45^1 = 46$$

$$\text{Hence } x = 1, y = 45$$

38. In 10 years, A will be twice as old as B was 10 years ago. If A is now 9 years older than B the present age of B is

Soln: $A + 10 = 2(B - 10) \dots\dots(1)$

$A = B + 9 \dots\dots(2)$

from equations. 1 & 2

we get $B = 39$ A will be $39 + 9 = 48$ years old.

39. A student can select one of 6 different math book, one of 3 different chemistry book & one of 4 different science book. In how many different ways students can select book of math, chemistry & science.

Sol: ${}^6C_1 \times {}^3C_1 \times {}^4C_1 = 6 \times 3 \times 4 = 72$ ways

40. Sum of two number is 50 & sum of three reciprocal is $1/12$ so find these two numbers

Sol : $x + y = 50 \dots\dots(1)$ $x = 50 - y \dots\dots(2)$

$1/x + 1/y = 1/12 \Rightarrow y + xxy = 1/12 \Rightarrow 12(y + x) = xy \dots\dots(3)$

put (2) in (4)

$\Rightarrow 12(y + 50 - y) = (50 - y)y$

$\Rightarrow 12y + 600 - 12y = 50y - y^2$

$\Rightarrow y^2 - 50y + 600 = 0$

$\Rightarrow y^2 - 30y - 20y + 600 = 0$

$\Rightarrow y(y - 30) - 20(y - 30) = 0$

$\Rightarrow (y - 20)(y - 30) = 0$

$y = 20$ or $y = 30$

if $y = 20$ then $x = 30$

or $y = 30$ then $x = 20$

two numbers are 30 & 20