

$$1. XZY + XYZ = YZX.$$

Find the three digits

Sol:

$$\text{2nd column, } Z + Y = Z \text{ shows a carry so, } Z + Y + 1 = 10 + Z \Rightarrow Y = 9$$

$$\text{1st column, } X + X + 1 = 9 \Rightarrow$$

$$X = 4 \text{ so, } Z = 5$$

$$459 + 495 = 954$$

$$X = 4, Y = 9, Z = 5$$

2. In a 5 digit number, 3 pairs of sum is 11 each. last digit is 3 times first one, 3rd digit is 3 less than 2nd, 4th digit is 4 more than the second one. Find the number.

Sol:

1st Digit \Rightarrow

a

2nd Digit \Rightarrow

b

3rd Digit \Rightarrow

$$(b - 3)$$

4th digit \Rightarrow

$$(b + 4)$$

5th Digit \Rightarrow

$$3a$$

So the number is : $(a)(b)(b - 3)(b + 4)(3a)$

Now, Let's analyze 1st and the 5th digit :

Possible combinations -

$$1 - 3$$

$$2 - 6$$

$$3 - 9$$

(Since 4 will yield 12 which is obviously more than 2 digits)

Now Let's analyze 2nd, 3rd and 4th Digits :

Possible Values of 2nd Digit i.e 'b' is :

$$5, 4, 3$$

$$\text{As, } (b - 3) > 0 \text{ i.e 3rd Digit and } (b + 4) \quad 1 + 3 + 7 = 11$$

$$\text{Similarly, } 24186 \text{ for } 4 - 1 - 8 \text{ and } 6 + 4 + 1 = 11$$

3rd Combination $5 - 2 - 9$ will get no possible match.

Hence, 2 solutions : 13073 and 24186

If Repetitions not allowed then Ans should be 24186

3. GOOD is coded as 164 then BAD as 21. If UGLY coded as 260 then JUMP?

Sol:

$$G O O D = 7 + 15 + 15 + 4 = 41$$

$$41 \times 4 = 164$$

Similarly

$$B A D = 2 + 1 + 4 = 7$$

$$7 \times 3$$

$$U G L Y = 21 + 7 + 12 + 25 = 65$$

$$65 \times 4$$

Similarly,

$$J U M P = 10 + 21 + 13 + 16 = 60$$

$$60 \times 4 = 240$$

4. Supposing a clock takes 7 seconds to strike 7. How long will it take to strike 10?

Sol:

7 strike of a clock have 6 intervals

While 10 strikes have 9 intervals.

Required time = (7×9)

) seconds = $10 \frac{1}{2}$ seconds.

Because time is only moving ahead ! so when we say between 1 to 2 hours, that means we assume only 1 hours not 2 hours.

5. An escalator is descending at constant speed. A walks down and takes 50 steps to reach the bottom. B runs down and takes 90 steps in the same time as A takes 10 steps. How many steps are visible when the escalator is not operating?

Sol:

Lets suppose that A walks down 1 step / min and escalator moves n steps/ min

It is given that A takes 50 steps to reach the bottom

In the same time escalator would have covered $50n$ steps

So total steps on escalator is $50 + 50n$.

Again it is given that B takes 90 steps to reach the bottom and time taken by him for this is equal to time taken by A to cover 10 steps i.e 10 minutes. So in this 10 min escalator would have covered $10n$ steps.

So total steps on escalator is $90 + 10n$

Again equating $50 + 50n = 90 + 10n$ we get $n = 1$

Hence total number of steps on escalator is 100.

6. Albert and Fernandes have two leg swimming race. Both start from opposite ends of the pool. On the first leg, the boys pass each other at 18 m from the deep end of the pool. During the second leg they pass at 10 m from the shallow end of the pool. Both go at constant speed but one of them is faster. Each boy rests for 4 seconds at the end of the first leg. What is the length of the pool?

Sol:

The solution is : Let the length of swimming pool be : D

let their speed be x and y . So according to question the fast swimmer (let x) would start from shallow end.

Thus

Let they first meet after time: t_1

$$x \times t_1 = D - 18$$

(1)

$$y \times t_1 = 18$$

(2)

(2) / (1) we get

$$yx = 18(D - 18)$$

--- (3)

Let t_2 be the time after which they meet 2nd time (the 4 sec delay is cancelled as both wait for 4 sec)

So

$$x \times t_2 = 2D - 10$$

---- (4)

(as x travelled one length complete to deep end + length from deep end to 10 m before shallow end)

$$4y \times t_2 = D + 10$$

----- (5)

(as y travelled one length complete to shallow end + 10 m from shallow end)

(5) / (4) we get

$$yx = (D + 10)(2D - 10)$$

----- (6)

from (3) and (6)

$$18(D - 18) = (D + 10)(2D - 10)$$

solving we get

$$D \times (D - 44) = 0$$

Since D cannot be zero

So $D = 44$ m answer.

7. 16, 36, 100, 324, _ ?

Find the next term.

Sol:

This sequence can be written as a sequence of squares of numbers as...

4^2

, $6^2, 10^2, 18^2$

The differences between the successive numbers are in geometric progression which is of

2, 4, 8, ?

2^1

, $2^2, 2^3, 2^4$

$$\begin{aligned} \text{The next number} &= (18 + 16)^2 \\ &= 1156 \end{aligned}$$

8. How many ways can one arrange the word EDUCATION such that relative positions of vowels and consonants remains same?

Sol:

The word EDUCATION is a 9 letter word with none of letters repeating

The vowels occupy 3, 5, 7th & 8th position in the word & remaining five positions are occupied by consonants

As the relative position of the vowels & consonants in any arrangement should remain the same as in the word EDUCATION

The four vowels can be arranged in 3rd, 5th, 7th & 8th position in $4!$ ways.

similarly the five consonants can be arranged in 1st, 2nd, 4th, 6th & 9th position in $5!$ ways

Hence the total number of ways = $5! \times 4! = 120 \times 24 = 2880$

9. There are 8 digits and 5 alphabets. In how many ways can you form an alphanumeric word using 3 digits and 2 alphabets?

Sol:

Select 3 digits from 8 digits i. e. 8C_3

ways

And also select 2 alphabets from 5 alphabets i.e., 5C_2

ways

Now to form a alphanumeric word of 5 characters we have to arrange the 5 selected digits.

So the answer is 8C_3

$\times {}^5C_2 \times$

$5! = 43200$

10. In an Octagon the number of possible diagonals are?

Sol:

Formula : Number of diagonals for n sided regular polygon = ${}^nC_2 - n$

For Octagon $n = 8$

Number of diagonals = 8C_2

$- 8 = 20$

11. What is the next number of the following sequence 7, 14, 55, 110, _ ?

Sol:

In that sequence first number is 7

$7 + 7 = 14$

$14 + 41 = 55$

$55 + 55 = 110$

110

+

= 121

Number in that sequence = 121

011

Next n

12. How many numbers are divisible by 4 between 1 to 100

Sol:

Sequence of numbers that are divisible by 4 between 1 to 100 are as follows

4, 8, 12, 16, - - - - - , 96

The series forms an Arithmetic Progression with

First number = $a = 4$

Common difference, $d = 4$

Last number = $l = 96$

Number of terms = n

Formula for last number in A.P. $l = [a + (n - 1) \times d]$

$$96 = 4 + (n-1) \times 4$$

$$n = 24$$

13. 5 cars are to be parked in 5 parking slots. there are 3 red cars, 1 blue car and 1 green car. How many ways the car can be parked?

Sol:

Total ways to park the cars having same color = 5!

But according to question ,there are 3 red cars,so no. of ways for parking

3 red cars= 3!

and both blue & green in 1 ways

so, $5!1! \times 3! \times 1!$

= 20 ways

Hence correct answer is 20 ways.

14. 12 persons can complete the work in 18 days. after working for 6 days, 4 more persons added to complete the work fast. in how many more days they will complete the work?

Sol:

Total work $12 \times 18 = 216$ units

After 6 days, work finished $6 \times 12 = 72$ units

Remaining work $216 - 72 = 144$ units

Remaining days= $144/(12+4)$

Answer is 9 days

15. A set of football matches is to be organized in a "round-robin" fashion, i.e., every participating team plays a match against every other team once and only once. If 21 matches are totally played, how many teams participated?

Sol:

Consider number of teams be n

nth has to with (n-1) matches

(n-1)th team has to play (n-2) matches,since every participating team plays a match against every other team once and only once.

Sequence folilows as

(n-1), (n-2), (n-3) - - - - - ,1

Formula for summation(x) for n terms = $n(n+1)/2$

But we have (n-1) terms so formula becomes $n(n-1)/2$

Equating formula to 21

n^2

- n

- 42=0

Factors = 7,-6

Number of teams =7

16. Next term in series 3, 32, 405, _

Sol:

First term $3 \times 12 = 3$

Second term $4 \times 23 = 32$

Third term $5 \times 34 = 405$

Fourth term $6 \times 45 = 6144$

17. A cube is divided into 729 identical cubelets. Each cut is made parallel to some surface of the cube. But before doing that the cube is colored with green color on one set of adjacent faces, red on the other set of adjacent faces, blue on the third set. So, how many cubelets are there which are painted with exactly one color?

Sol:

Total cubes created are 729

So a plane of big cube has 9×9 cubes

Out of that $(n - 2) \times (n - 2) = 7 \times 7 = 49$ are painted only one side

and a cube has six sides $= 6 \times 49 = 294$

18. Find the radius of the circle inscribed in a triangle ABC. Triangle ABC is a right-angled isosceles triangle with the hypotenuse as $62\sqrt{2}$ cm.

Sol:

Since hypotenuse is $62\sqrt{2}$ cm.

Sides are 6 cm each as it is an isosceles triangle.

Now, if we have an inscribed circle the property is the point where the circle touches the sides are exactly $\frac{2}{3}$ rd of the length of sides, i.e, $\frac{2}{3} \times 6 = 4$ cm.

Now, if you drop 2 radii on the sides of triangle then they act as perpendiculars on sides. So, it forms a small square of $(6 - 4) = 2$ cm each side.

Thus, radius of the circle is 2 cm.

19. How many boys are there in the class if the number of boys in the class is 8 more than the number of girls in the class, which is five times the difference between the number of girls and boys in the class.

Sol:

Let number of boys = b

Number of girls = g

then

given

$b = 8 + g = 5(b - g)$ [$b - g = 8$ from given equation]

$b = 5 \times 8$

$b = 40$

20. If dolly works hard then she can get A grade

1. If dolly does not work hard then she can get A grade

2. If dolly gets an A grade then she must have worked hard

3. If dolly does not get an A grade then she must not have worked hard

4. Dolly wishes to get A grade

Sol:

Option 3 is correct as it is contrapositive of the given statement.