

Q No: 07

(a)

In a survey of 100 people, 65 watch Cricket, 40 watch Hockey and 20 watch neither. How many people watch both Cricket and Hockey?

Solution:

Given Data:

$$\text{Total People} = 100 \quad (C, H) \text{ Neither} = 20$$

$$100 - 20 = 80$$

We know that

$$\text{Cricket watcher} = 65, \text{ Hockey watcher} = 40, \text{ Both} = x$$

Using formula

$$\text{Cricket} + \text{Hockey} - \text{Both} = \text{At least one}$$

$$65 + 40 - x = 80$$

$$105 - x = 80$$

$$x = 105 - 80 = 25$$

People who watch both cricket and Hockey is 25

~~Q16/80~~

A rectangular swimming pool has a length that is 4 meters more than its width. If perimeter of the pool is 72 meters, what is the volume of water needed to fill the pool to a uniform depth of 2.5 meters?

SOLUTION

Given Data

Perimeter of pool = $P = 72\text{ m}$ • Length is 4m more than width

Depth (uniform) $h = 2.5\text{ m}$

Unknown Data

width = w (m) • Length = l (m) • volume of water = V (m^3)

Calculations

Let the width be w (m). Then the length is $w+4$ (m)

Perimeter = $2(l+w) = 72$, so

$$2(w + (w+4)) = 72$$

$$2(2w+4) = 72 \Rightarrow 2w+4 = 36 \Rightarrow 2w = 36-4 = 32$$

$$2w = 32 \Rightarrow \frac{2}{2}w = \frac{32}{2} = 16 \Rightarrow w = 16$$

$$\text{Length} = l = w+4 \Rightarrow 16+4 \Rightarrow 20\text{ m} = l$$

$$\Rightarrow \text{Surface area} = 16 \times 20 = 320\text{ m}^2$$

$$\text{Depth} = 2.5\text{ m}, \text{ so volume} = 320 \times 2.5 = 800\text{ m}^3$$

$$\text{Volume} = V = 800\text{ m}^3$$

~~Q(C)10~~

Train leaves a city A at 8:00AM traveling at 60 km/hr. Another train leaves city B at the same time, travelling towards city A at 40 km/h. If the distance b/w city A and city B = 400 km, at what time both will the two trains meet?

Given Data

- Train 1 leaves city A at 8:00AM, Speed = 60 km/hr.
- Train 2 leaves city B at 8:00AM, Speed = 40 km/hr.
- Distance b/w city A & B = 400 km

Unknown

Time at which both trains meet

Solution

Combined the relative speed

• Since both trains are moving towards each other

$$\text{Rel. speed} = 60 + 40 = 100 \text{ km/hr.}$$

Use formula

$$\text{Time} = \frac{\text{Distance}}{\text{Rel. Speed}} \Rightarrow \text{Time} = \frac{400}{100} = 4 \text{ hours.}$$

Add this time to starting time

$$\text{Start time} = 8:00 \text{ AM} \Rightarrow 8:00 \text{ AM} + 4 \text{ hours} = 12 \text{ PM}$$

The two trains will meet at 12:00 PM (noon)

Q.11

The Sum of the Present ages of a father and his son is 75 years. Ten years ago, the father's age was four times the son's age. What are their current ages?

Given Data:

Sum of Present ages (Father + son) = 75 years.

10 years ago : Father's age = $4 \times$ son's age.

To Find:

Present age of father = Present age of son

Let

Present age of son = x & Present age of father = $75 - x$.

Solution

Use Condition from 10 years ago

Father's age = $75 - x - 10 = 65 - x$ & Son's age = $x - 10$

Given $\Rightarrow 65 - x = 4(x - 10)$

Solve eq = $65 - x = 4x - 40$

Add x on both side = $65 = 5x - 40$

Add 40 on both sides = $65 + 40 = 5x - 40 + 40$

$105 = 5x \Rightarrow$ divide 5 on BS $\Rightarrow \frac{105}{5} = \frac{5x}{5}$

$x = 21 \Rightarrow$ Son's age = father's age = $75 - 21 = 54$

Son's Present age = 21 years

Father's Present age = 54 years

QNO: 08

Q. 08

In a certain code language, if 'ROAD' is coded as 'UQDQ', how would 'LAKE' be coded in the same language? Explain the rule of coding.

Solution

Look at ROAD $\rightarrow$ UQDQ letter by letter $\rightarrow$ alphabetical order.

$$R = (18) \rightarrow U = (21) \Rightarrow +3$$

$$O = (15) \rightarrow Q = (17) \Rightarrow +2$$

$$A = (1) \rightarrow D = (4) \Rightarrow +3$$

$$D = (4) \rightarrow G = (7) \Rightarrow +3$$

Rule observed: every letter is shifted forward in the alphabet by 3 places, except the 2nd letter, which is shifted by 2 places.

Apply the rule to LAKE

$$L = (12) + 3 = 15 \Rightarrow O$$

$$A = (1) + 2 = 3 \Rightarrow C$$

$$K = (11) + 3 = 14 \Rightarrow N$$

$$E = (5) + 3 = 8 \Rightarrow H$$

So,

$$LAKE = OCNH.$$

Q(b)

A man tells a woman, "The son of my sister's husband is the father of your son". How is the woman related to the man?

Solution

Let's name people to keep it clear

Man = M M's Sister = S S's Husband = H

The Son of S's husband (ie = son of S & H) = N.

The sentence says "N is the father of your son" so

N is the father of woman's son (ie N is the husband of woman).

Therefore, the woman is the wife of N, and N is M's

Nephew (son of M's sister). So woman is the wife of

M's nephew $\Rightarrow$ (commonly called niece or ~~niece~~ niece-in-law)

The woman is the man's niece-in-law

Q(c)

Find the next number in each of the following sequences and explain the patterns

(i) 4, 12, 6, 18, 9, 27,?

Pattern: multiply by 3, then divided by 2, alternately

$4 \rightarrow (\times 3) 12 \rightarrow (\div 2) 6 \rightarrow (\times 3) 18 \rightarrow (\div 2) 9 \rightarrow (\times 3) 27 \rightarrow (\div 2) \Rightarrow 13.5$

ii) 1, 2, 6, 24, 120, 720

Pattern : factorial sequence.

$$1 = 1!$$

$$2 = 2!$$

$$6 = 3!$$

$$24 = 4!$$

$$120 = 5!$$

$$6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720.$$

Each number is the Product of all whole numbers from 1 up to that number. This is called factorial Pattern.

~~Q(d)~~

Five friends (P, Q, R, S, T) have different heights

- P is Shorter than Q but taller than R.
- S is Shorter than T but taller than Q.
- The Shortest person is 150cm tall, and the tallest 180cm tall. who among the friends tallest, and what is the max Possible range of their heights?

Solution:

Given:

$$R < P < Q$$

$$Q < S < T$$

So putting them together.

$$R < P, Q < S < T.$$

This is the complete order from Shortest to tallest

Identifying the tallest

Order from shortest $\rightarrow$ tallest.

1 : R

2 : P

3 : Q

4 : S

5 : I

$\therefore$ 3rd is the tallest = Q

Max range

Range = tallest - shortest

$$180\text{cm} - 150\text{cm} = +30\text{cm}$$

Answer =

Tallest = Q

$\therefore$ Range = 30 cm