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# Mixed math questions for SSC CGL, SSC 10+2

## SSC MATHS QUIZ 2

Directions: Read the following questions carefully and choose the right answer.

1. Mr. Sinha distributes a certain sum of money among his five sons, one daughter and his wife in such a way that each son gets double the amount of his daughter and the wife gets double the amount of each son. If each son gets Rs. 15000, what was the total amount distributed?

A. Rs. 123000

B. Rs. 112500

C. Rs. 138500

D. Rs. 132500

2. Abhishek Jain typed 50 pages at the rate of 30 pages per hour on Sunday. On Monday, he could only type 50 extra pages at the rate of 20 pages per hour. What has his average rate of typing been overall. Calculate in pages per hour?

A. 30

B. 24

C. 48

D. 35

3. In covering a distance of 30 km Amit takes 2 hours more than Suresh, If Amit doubles his speed, he would take 1 hour less than Suresh. Amit's speed is:

A. 5 km/hr

B. 7.5 km/hr

C. 6 Km/hr

D. 6.25 km/hr

4. What would be the measure of the diagonal of a square whose area is equal to 578 sq cm?

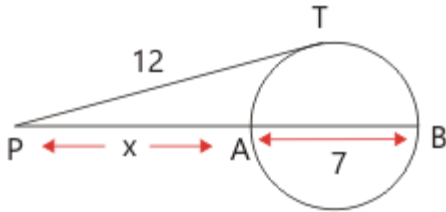
A. 38 cm

B. 32 cm

C. 42 cm

D. 34 cm

5. Find the value of  $x$  in the given figure.



A. 9

B. 16

C. 7

D. 14

6. If  $\cot\left(\frac{\pi}{2} - \frac{\theta}{2}\right) = \sqrt{3}$ , then the value of  $\sin \theta - \cos \theta = ?$

A.  $\frac{1}{2}$

B.  $\frac{\sqrt{3}}{2}$

C.  $\frac{\sqrt{3}+1}{2}$

D.  $\frac{\sqrt{3}-1}{2}$

7. A sum of money at compound interest amounts to fifth-hold itself in 7 years. In how many years will it be 25 times itself?

A. 14 years

B. 8 years

C. 6 years

D. 3 years

8. A balloon is connected to a meteorological station by a cable of length 200 m, inclined at  $60^\circ$  to the horizontal. Find the height of the balloon from the ground. Assume that there is no slack in the cable.

A. 173.2 m

B. 143.8 m

C. 163.5 m

D. None of these

9. A ladder is placed against a wall such that its foot is at a distance of 2.5 m from the wall and its top reaches a window 6 m above the ground. Find the length of the ladder.

A. 8.5 m

B. 6.5 m

C. 4.5 m

D. 2.5 m

10. If  $2^{2x-1} = \frac{1}{8^{x-3}}$ , then the value of x is :

A. 3

B. 2

C. 0

D. -2



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### Correct answers:

1	2	3	4	5	6	7	8	9	10
B	B	A	D	A	C	A	A	B	B

### Explanations:

1.

Following the information given in the question, we get

5 sons get  $15000 \times 5 = \text{Rs. } 75000$

$\therefore$  1 daughter gets  $15000 \div 2 = \text{Rs. } 7500$

$\therefore$  Wife gets  $= 15000 \times 2 = \text{Rs. } 30000$

Total amount  $= 75000 + 7500 + 30000 = \text{Rs. } 112500/-$

Hence, option B is correct.

2.

As per the question,

No. of hours Abhishek typed on Sunday  $= \frac{50}{30} = \frac{5}{3}$

No. of hours Abhishek typed on Monday  $= \frac{50}{20} = \frac{5}{2}$

Total hours of typing  $= \frac{5}{3} + \frac{5}{2} = \frac{25}{6}$

Total pages typed  $= 50 + 50 = 100$

$$\text{Average rate of typing} = \frac{100}{\frac{25}{6}} = 6 \times 4 = 24$$

Hence, Abhishek Jain typed 24 pages per hour.

Hence, option B is correct.

**3.**

Let Amit's speed =  $x$  km/hr and Suresh's speed =  $y$  km/hr.

$$\frac{30}{x} - \frac{30}{y} = 2 \quad \& \quad \frac{30}{y} - \frac{30}{2x} = 1.$$

putting  $\frac{1}{x} = u$  and  $\frac{1}{y} = v$ , these questions become:

$$15u - 15v = 1 \quad \text{and} \quad -15u + 30v = 1$$

On solving these equations, we get  $u = \frac{1}{5}$  &  $v = \frac{2}{15}$

$$\therefore \frac{1}{x} = \frac{1}{5} \quad \text{and} \quad \frac{1}{y} = \frac{2}{15}, \quad \text{So, } x = 5 \quad \& \quad y = \frac{15}{2}$$

Hence, Amit's speed = 5 km/hr.

Hence, option A is correct.

**4.**

$$\therefore \text{Area of a square} = \frac{1}{2} (\text{Diagonal})^2$$

$$\therefore (\text{Diagonal})^2 = 2 \times 578 = 1156$$

Diagonal =  $\sqrt{1156} = 34$  cm

Hence, option D is correct.

5.

Since, PT is a tangent and PAB is a secant to the circle.

$$\therefore PT^2 = PA \cdot PB$$

$$144 = x(x+7)$$

$$\Rightarrow x^2 + 7x - 144 = 0$$

$$\Rightarrow (x + 16)(x - 9) = 0$$

$$\Rightarrow x = 9 \quad (\because x = -16 \text{ is not possible.})$$

Hence, option A is correct.

6.

$$\cot\left(\frac{\pi}{2} - \frac{\theta}{2}\right) = 3$$

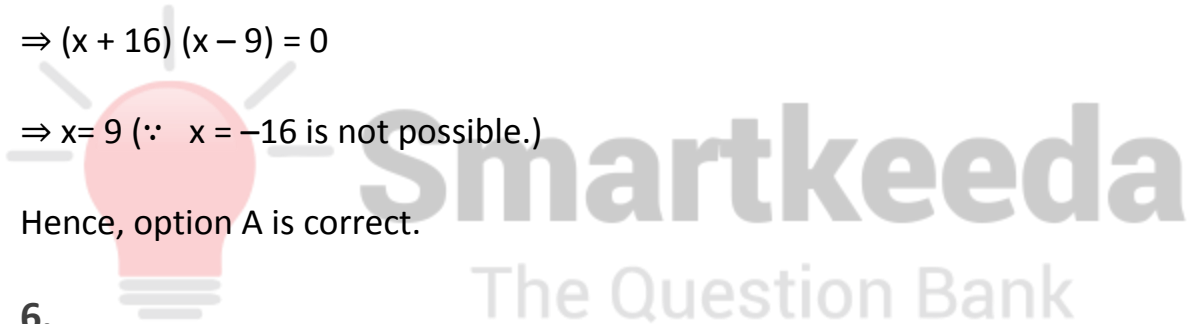
$$\cot\left(\frac{\pi}{2} - \frac{\theta}{2}\right) = \cot 30^\circ$$

$$\text{or, } 90^\circ - \frac{\theta}{2} = 30^\circ$$

$$\text{or, } \frac{\theta}{2} = 60^\circ$$

$$\therefore \theta = 120^\circ$$

Now,  $\sin\theta - \cos\theta = \sin 120^\circ - \cos 120^\circ$



$$= \sin (90^\circ + 30^\circ) - \cos (90^\circ + 30^\circ)$$

$$= \cos 30^\circ + \sin 30^\circ$$

$$= \frac{3}{2} + \frac{1}{2} = \frac{3+1}{2}$$

Hence, option C is correct.

7.

**Approach I:**

To find the time we can apply the shortcut approach

$$m^{1/T_1} = n^{1/T_2}$$

Here  $m$  and  $n$  represent the number of times the given sum is becoming, in the first and the second case respectively.

$T_1$  &  $T_2$  are the numbers of years in the first and the second case respectively.

Here,  $m = 5$  and  $n = 25$

$T_1 = 7$  years and  $T_2 = ?$

Putting the values, we get

$$5^{1/7} = 25^{1/T_2} = (5^2)^{1/T_2} = 5^{2/T_2}$$

$$\therefore \frac{1}{7} = \frac{2}{T_2}$$

$$\therefore T_2 = 14 \text{ years}$$



**Approach II:**

Let the sum be ₹ P.

In the first case,

$$\therefore P\left(1 + \frac{R}{100}\right)^7 = 5P$$

$$\Rightarrow \left(1 + \frac{R}{100}\right)^7 = 5 \quad \dots\text{(i)}$$

In the second case,

$$P\left(1 + \frac{R}{100}\right)^n = 25P$$

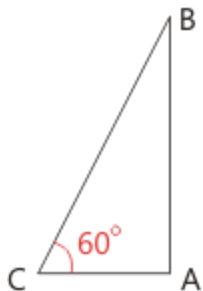
$$\Rightarrow \left(1 + \frac{R}{100}\right)^n = 25 = (5)^2 = \left[\left(1 + \frac{R}{100}\right)^7\right]^2 \quad [\text{using (i)}]$$

$$\Rightarrow \left(1 + \frac{R}{100}\right)^n = \left(1 + \frac{R}{100}\right)^{14}$$

$$\therefore n = 14 \text{ years}$$

Hence, option A is correct.

**8.**



Let B be the balloon and AB be the vertical height. Let C be the

meteorological station and CB be the cable.

Then,  $BC = 200$  m and  $\angle ACB = 60^\circ$

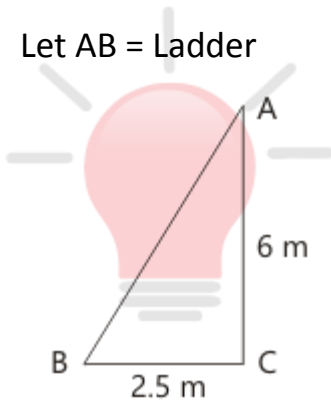
$$\text{Then, } \frac{AB}{BC} = \sin 60^\circ = \frac{3}{2} \Rightarrow \frac{AB}{200} = \frac{3}{2}$$

$$\Rightarrow AB = \left(\frac{200 \times 3}{2}\right) \text{ m} = 173.2 \text{ m.}$$

Hence, option A is correct.

**9.**

Let AB = Ladder



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$$\text{In } \triangle ABC, AB^2 = BC^2 + AC^2$$

$$= (2.5)^2 + (6)^2 = 42.25$$

$$\therefore AB = \sqrt{42.25} = 6.5 \text{ m}$$

Hence, option B is correct.

**10.**

$$2^{2x-1} = \frac{1}{8^{x-3}} = 8^{3-x} = 2^{3(3-x)} = 2^{9-3x}$$

$$\Leftrightarrow 2x - 1 = 9 - 3x \Leftrightarrow x = 2.$$

Hence, option B is correct.



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