

Solution of the day/Sep-10, 2018

6th Class

➤ Mathematics:

Sol: Let $4 : 5 :: 12 : x$. Then, $4 \times x = 5 \times 12$ or $x = \left(\frac{5 \times 12}{4}\right) = 15$

Hence, the fourth proportional to 4, 5 and 12 is 15.

➤ Physics: Ans: (C)

➤ Chemistry: Ans: (A)

➤ Biology: Ans: (B)

7th Class

➤ Mathematics: Ans: (A)

➤ Physics: Ans: (B)

➤ Chemistry: Ans: (A)

➤ Biology: Ans: (D)

8th class

➤ Mathematics:

Sol: $15 \cot \theta = 8 \Rightarrow \cot \theta = \frac{8}{15}$.

Let us draw a ΔABC in which $\angle B = 90^\circ$

Let $\angle A = \theta^\circ$. Then, $\cot \theta = \frac{AB}{BC} = \frac{8}{15}$.

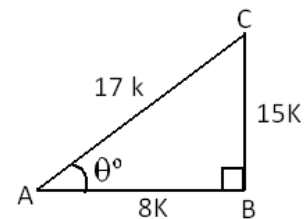
Let $AB = 8k$ and $BC = 15k$, where k is constant of proportionality.

By Pythagoras' theorem, we have

$$AC^2 = (AB^2) + (BC^2) = (8k)^2 + (15k)^2 = (64k^2 + 225k^2) = 289k^2$$

$$\therefore AC = \sqrt{289k^2} = 17k \therefore \sin \theta = \frac{BC}{AC} = \frac{15k}{17k} = \frac{15}{17} \text{ and } \cos \theta = \frac{AB}{AC} = \frac{8k}{17k} = \frac{8}{17}$$

$$\therefore \frac{(1 + \sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(1 - \cos \theta)} = \frac{\left(1 + \frac{15}{17}\right)\left(1 - \frac{15}{17}\right)}{\left(1 + \frac{8}{17}\right)\left(1 - \frac{8}{17}\right)} = \frac{\left(\frac{32}{17} \times \frac{2}{17}\right)}{\left(\frac{25}{17} \times \frac{9}{17}\right)} = \frac{64}{225}$$



➤ **Physics:** Ans: Average velocity

➤ **Chemistry:** Ans: (A)

➤ **Biology:** Ans: (B)

9th Class

➤ **Mathematics:**

Sol: (D) Let $a \sin \theta - b \cos \theta = k$, $a \cos \theta + b \sin \theta = c$

$$c^2 + k^2 = a^2 \sin^2 \theta + b^2 \cos^2 \theta - 2ab \cos \theta \sin \theta + a^2 \cos^2 \theta + 2ab \cos \theta \sin \theta$$

$$= a^2 (\cos^2 \theta + \sin^2 \theta) + b^2 (\sin^2 \theta + \cos^2 \theta) \Rightarrow c^2 + k^2 = a^2 + b^2$$

$$= k^2 = a^2 + b^2 - c^2. \therefore (a \sin \theta - b \cos \theta)^2 = a^2 + b^2 - c^2$$

➤ **Physics:** Ans: Projectile

➤ **Chemistry:** Ans: (D)

➤ **Biology:** Ans: (C)

10th class

➤ **Mathematics:**

$$\text{Sol: } \sqrt{3} \tan \theta = 3 \sin \theta \Rightarrow \sqrt{3} \frac{\sin \theta}{\cos \theta} = 3 \sin \theta \Rightarrow \frac{\sqrt{3}}{\cos \theta} = \frac{3}{1} \Rightarrow 3 \cos \theta = \sqrt{3}$$

$$\Rightarrow \cos \theta = \frac{1}{\sqrt{3}} \Rightarrow \cos^2 \theta = \frac{1}{3} \dots \dots (1)$$

$$\text{Now, } \sin^2 \theta = \frac{BC}{AC} = \frac{\sqrt{2}}{\sqrt{3}} \Rightarrow \sin^2 \theta = \frac{2}{3} \dots \dots (2)$$

$$\therefore \sin^2 \theta - \cos^2 \theta = \frac{2}{3} - \frac{1}{3} = \frac{1}{3}$$

➤ **Physics:** Ans: (D)

➤ **Chemistry:** Ans: (B)

➤ **Biology:** Ans: (A)

➤ **Reasoning :**

Sol: The numbers are cubes of primes i.e., $2^3, 3^3, 5^3, 7^3, 11^3$. Clearly none is the odd man.

Hence, (D)