

Solution of the day/Sep-11, 2018

6th Class

➤ **Mathematics:**

Sol: Third proportional to 9 and 12 is the same as the fourth proportional to 9, 12 and 12.

$$\text{Let } 9 : 12 :: 12 : x. \text{ Then, } 9 \times x = 12 \times 12 \text{ or } x = \left(\frac{12 \times 12}{9}\right) = 16$$

Hence, the third proportional to 9 and 12 is 16.

➤ **Physics:** Ans: (B)

➤ **Chemistry:** Ans: (A)

➤ **Biology:** Ans: (C)

7th Class

➤ **Mathematics:** Ans: (C)

➤ **Physics:** Ans: (B)

➤ **Chemistry:** Ans: (B)

➤ **Biology:** Ans: (B)

8th class

➤ **Mathematics:**

Sol: In figure $\triangle ABC$ is right angled at B and $\angle BAC = \theta$ and $\sin \theta = \frac{m}{n}$.

$$\Rightarrow \frac{BC}{AC} = \frac{m}{n} \Rightarrow BC = mk \text{ and } AC = nk, k \text{ is constant of proportionality.}$$

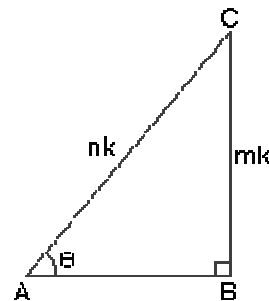
By Pythagoras theorem, we have $AC^2 = AB^2 + BC^2$

$$\Rightarrow (nk)^2 = AB^2 + (mk)^2 \Rightarrow AB^2 = n^2k^2 - m^2k^2 = (n^2 - m^2)k^2 \Rightarrow AB = \sqrt{(n^2 - m^2)} \times k$$

$$\therefore \tan \theta = \frac{BC}{AB} = \frac{mk}{\sqrt{(n^2 - m^2)} \times k}; \quad \cot \theta = \frac{AB}{BC} = \frac{\sqrt{(n^2 - m^2)} \times k}{mk}$$

$$\frac{\tan \theta + 4}{4 \cot \theta + 1} = \frac{\frac{mk}{\sqrt{(n^2 - m^2)} \times k} + 4}{4 \times \frac{\sqrt{(n^2 - m^2)} \times k}{mk} + 1} = \frac{\frac{m}{\sqrt{n^2 - m^2}} + 4}{\frac{4\sqrt{n^2 - m^2}}{m} + 1}$$

$$= \frac{(m + 4\sqrt{n^2 - m^2})}{\sqrt{n^2 - m^2}} \times \frac{m}{(4\sqrt{n^2 - m^2} + m)} = \frac{m}{\sqrt{n^2 - m^2}}$$



➤ **Physics:** Ans: X-axis

➤ **Chemistry:** Ans: (B)

➤ **Biology:** Ans: (C)

9th Class

➤ **Mathematics:**

Sol: (A) $1 = \sin^2 \beta + \cos^2 \beta = \frac{\sin^2 \alpha}{a^2} + \frac{\cos^2 \alpha}{b^2} \Rightarrow \sec^2 \alpha = \frac{\tan^2 \alpha}{a^2} + \frac{1}{b^2} \Rightarrow a^2 b^2 (1 + \tan^2 \alpha) = b^2 \tan^2 \alpha + a^2$

$$\Rightarrow (b^2 - a^2 \tan^2 \alpha) \tan^2 \alpha = a^2 b^2 - a^2 \Rightarrow \tan^2 \alpha = \frac{a^2 b^2 - a^2}{b^2 - a^2 \tan^2 \alpha} \Rightarrow \tan \alpha = \pm \sqrt{\frac{a^2 b^2 - a^2}{b^2 - a^2 \tan^2 \alpha}}$$

➤ **Physics:** Ans: Less than are equal to 1

➤ **Chemistry:** Ans: (B)

➤ **Biology:** Ans: (C)

10th class

➤ **Mathematics:**

Sol: We have, $\tan \theta + \frac{1}{\tan \theta} = 2$

Squaring both sides, we get

$$\Rightarrow \left(\tan \theta + \frac{1}{\tan \theta} \right)^2 = 2^2 \Rightarrow \tan^2 \theta + \frac{1}{\tan^2 \theta} + 2(\tan \theta) \left(\frac{1}{\tan \theta} \right) = 4$$

$$\Rightarrow \tan^2 \theta + \frac{1}{\tan^2 \theta} + 2 = 4 \Rightarrow \tan^2 \theta + \frac{1}{\tan^2 \theta} = 4 - 2$$

$$\Rightarrow \left(\tan \theta + \frac{1}{\tan \theta} \right)^2 = 2$$

➤ **Physics:** Ans: (B)

➤ **Chemistry:** Ans: (C)

➤ **Biology:** Ans: (A)

➤ **Reasoning :**

Sol: Go on dividing by 4 to get the next number. So, 200 is the man. Hence, (C)