TRIGONOMETRY TEST SOLUTIONS

Question 1

If $\sin x = 2\cos x$, what is the value of $\sin x \cos x$?

A. $\frac{1}{3}$ B. $\frac{2}{5}$ C. $\frac{3}{5}$ D. $\frac{2}{3}$

Solution

$$\sin x = 2\cos x$$

$$\therefore \sin x \cos x = 2\cos^2 x \qquad \sin^2 x + \cos^2 x = 1$$

$$= \frac{2}{\sec^2 x} \qquad \therefore \frac{\sin^2 x}{\cos^2 x} + \frac{\cos^2 x}{\cos^2 x} = \frac{1}{\cos^2 x}$$

$$= \frac{2}{1 + \tan^2 x} \qquad \therefore \tan^2 x + 1 = \sec^2 x$$

$$= \frac{2}{1 + 2^2} \qquad \sin x = 2\cos x, \text{ so } \tan x = 2$$

$$= \frac{2}{5}$$

So, the correct answer is B.

Question 2

If $\tan A + \sec A = 2$, what is the value of sin A?

A. $\frac{2\sqrt{2}}{3}$ B. $\frac{4}{5}$ C. $\frac{3}{5}$ D. $\frac{1}{3}$

Solution

Using the identity $\sec^2 A = 1 + \tan^2 A$

$$\therefore \tan^2 A - \sec^2 A = -1$$

$$\therefore (\tan A + \sec A)(\tan A - \sec A) = -1$$

$$\therefore 2(\tan A - \sec A) = -1$$

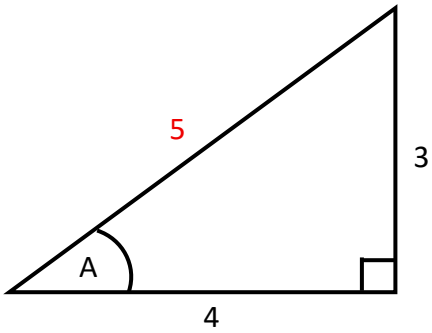
Now we have $\tan A + \sec A = 2$

and $\tan A - \sec A = -\frac{1}{2}$

Adding gives $2\tan A + \sec A = \frac{3}{2}$

$\therefore \tan A = \frac{3}{4}$

$\therefore \sin A = \frac{3}{5}$

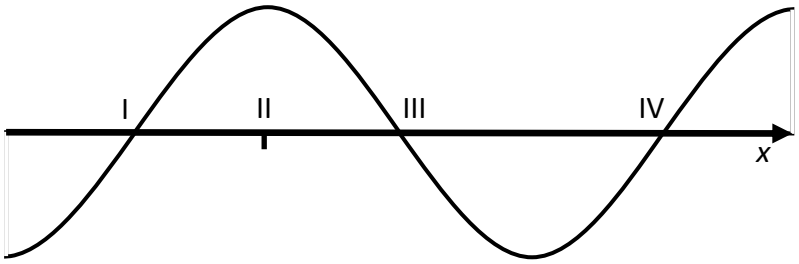


$3^2 + 4^2 = 5^2$

So, the correct answer is C.

Question 3

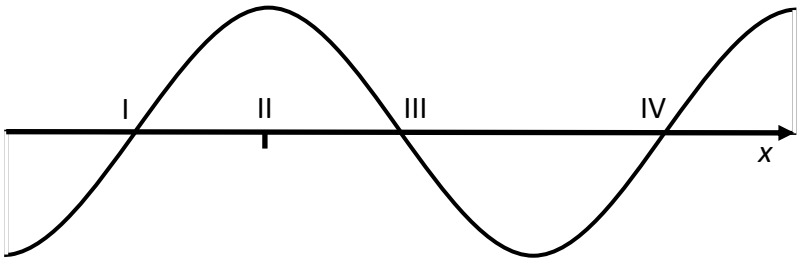
Through which point should the *y*-axis be drawn so that the graph of $y = \cos x$ is represented?



A. I B. II C. III D. IV

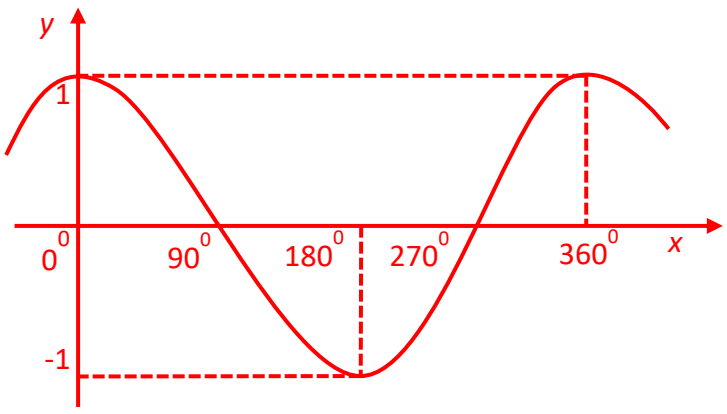
Solution

Compare the given graph with the basic cosine graph shown on the right.



By inspection, the *y*-axis must pass through the point II.

So, the correct answer is B.



Question 4

If $\sin 12^0 = 0,208$, which one of the following statements is true?

A. $\sin 102^0 = -0,208$ B. $\sin 348^0 = 0,208$ C. $\sin 78^0 = -0,208$ D. $\sin 168^0 = 0,208$

Solution

$$\sin x = \sin(180^0 - x)$$

$$\therefore \sin 12^0 = \sin(180^0 - 12^0)$$

$$= \sin 168^0$$

$$= 0,208$$

So, the correct answer is D.

Question 5

If $4\sin\theta = \sec\theta$ and $0^0 \le \theta \le 360^0$, what are the values of θ?

A. θ = 0^0 or 180^0 B. θ = 15^0 or 75^0 C. θ = 30^0 or 150^0 D. θ = 60^0 or 300^0

Solution

$$4\sin\theta = \sec\theta$$

$$\text{i.e.,} \quad 4\sin\theta = \frac{1}{\cos\theta}$$

$$\therefore 4\sin\theta\cos\theta = 1$$

$$2\sin 2\theta = 1$$

$$\therefore \sin 2\theta = \frac{1}{2}$$

This means that $2\theta = 30^0$ or 150^0

$$\therefore \theta = 15^0 \text{ or } 75^0$$

So, the correct answer is B.