

Mother's Advance • Trigonometry

41. Consider the following :

निम्नलिखित पर विचार कीजिए-

I. $\sqrt{\frac{1-\cos\theta}{1+\cos\theta}} = \operatorname{cosec}\theta - \cot\theta$

II. $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$

Which of the above is/are true identity/ identities?

उपर्युक्त में से कौन-सी सर्वसमिका/सर्वसमिकाएँ सत्य है/हैं ?

- (A) Only I (B) Only II
(C) Both I and II (D) Neither I nor II

42. If/यदि

$p = \sqrt{\frac{1-\sin x}{1+\sin x}}$, $q = \frac{1-\sin x}{\cos x}$ and/तथा $r = \frac{\cos x}{1+\sin x}$,

then which of the following is/are correct?

तो निम्नलिखित में से कौन-सा/से कथन सही है/हैं ?

I. $p = q = r$

II. $p^2 = qr$

Select the correct answer using the codes given below:

नीचे दिए गए कूट का प्रयोग कर सही उत्तर चुनिए :

- (A) Only I (B) Only II
(C) Both I and II (D) Neither I nor II

43. If $\sin A = 3/5$ and A is an acute angle, then $\tan A + \sec A$ is equal to?

यदि $\sin A = 3/5$ तथा A न्यून कोण है, तो $\tan A + \sec A$ किसके तुल्य है ?

- (A) 0 (B) 1
(C) 2 (D) -1

44. If $\sin\theta = \frac{x^2 - y^2}{x^2 + y^2}$, then which one of the following is correct?

यदि $\sin\theta = \frac{x^2 - y^2}{x^2 + y^2}$ है, तो निम्नलिखित में से कौनसा एक सही है ?

- (A) $\cos\theta = \frac{2xy}{x^2 - y^2}$ (B) $\cos\theta = \frac{2xy}{x^2 + y^2}$
(C) $\cos\theta = \frac{x - y}{x^2 + y^2}$ (D) $\cos\theta = \frac{xy(x - y)}{x^2 + y^2}$

45. If $\tan\theta = \frac{5}{6}$ then what is the value of

$$\frac{12\sin\theta - 5\cos\theta}{12\sin\theta + 5\cos\theta}$$

यदि $\tan\theta = \frac{5}{6}$ है, तो $\frac{12\sin\theta - 5\cos\theta}{12\sin\theta + 5\cos\theta}$ का मान कितना होगा ?

- (A) $\frac{2}{3}$ (B) $\frac{1}{3}$ (C) $\frac{3}{4}$ (D) $\frac{1}{4}$

Solution

1. (C)

2. (B) Given, $5\tan\theta = 4 \Rightarrow \tan\theta = \frac{4}{5}$

$$\Rightarrow \frac{3\sin\theta - 2\cos\theta}{2\sin\theta + 3\cos\theta}$$

$$\Rightarrow \frac{3\left(\frac{\sin\theta}{\cos\theta}\right) - 2\left(\frac{\cos\theta}{\cos\theta}\right)}{2\left(\frac{\sin\theta}{\cos\theta}\right) + 3\left(\frac{\cos\theta}{\cos\theta}\right)}$$

$$= \frac{3\tan\theta - 2 \times 1}{2\tan\theta + 3} = \frac{3 \times \frac{4}{5} - 2}{2 \times \frac{4}{5} + 3}$$

$$= \frac{\frac{12-10}{5}}{\frac{8+15}{5}} = \frac{2}{23}$$

3. (D)

4. (D) $\frac{\sin\theta}{\cos\theta} = \frac{4}{5} \Rightarrow \frac{5 \times 4 - 3 \times 5}{5 \times 4 + 2 \times 5} = \frac{20-15}{20+10} = \frac{5}{30} = \frac{1}{6}$

5. (A) Given, $\sin\theta = \frac{3}{4}$

$$16\cos^2\theta + \tan^2\theta = 16\cos^2\theta + \frac{\sin^2\theta}{\cos^2\theta}$$

$$= 16(1 - \sin^2\theta) + \frac{\sin^2\theta}{(1 - \sin^2\theta)}$$

$$= 16 \times \left(1 - \frac{9}{16}\right) + \frac{\frac{9}{16}}{\left(1 - \frac{9}{16}\right)}$$

$$= 16 \times \left(\frac{7}{16}\right) + \frac{\frac{9}{16}}{\left(\frac{7}{16}\right)} = 7 + \frac{9}{7} = \frac{58}{7}$$