Trigonometry Questions for SSC CGL Tier 1 & 2 and 10+2 Exams

TRIGONOMETRY QUIZ 4

Direction: Study the following questions carefully and choose the right answer:

(1). If sin A = $\frac{3}{5}$ and A is an acute angle, then tan A + sec A is equal to

A. 0 B. 1

C. 2 D. –1

(2). What is the value of $\frac{\tan A - \sin A}{\sin^3 A}$?

A. $\frac{\sec A}{1 - \cos A}$ B. $\frac{\sec A}{1 + cos2\ A}$

C. $\frac{\sec A}{1 + \cos A}$ D. None of these

(3). $(1 - \tan A)^2 + (1 + \tan A)^2 + (1 - \cot A)^2 + (1 + \cot A)^2$ is equal to

A. $\sin^2 A \cdot \cos^2 A$ B. $\sec^2 A \cdot \text{cosec}^2 A$

C. $2\sec^2 A \cdot \text{cosec}^2 A$ D. None of these

(4). If α, β and γ are acute angles such that sin α = $\frac{\sqrt{3}}{2}$ cos β = $\frac{\sqrt{3}}{2}$ and tan γ = 1, then what is α + β + γ equal to?

A. 105° B. 120°

C. 135° D. 150°

(5). If cos A + cos^2A = 1, then what is the value of 2(sin^2 A + sin^4A)?

A. 4 B. 2

C. 1 D. $\frac{1}{2}$

(6). If ΔABC is right angles at C, then what is cos (A + B) + sin (A + B) equal to?

A. 0 B. $\frac{1}{2}$

C. 1 D. 2

(7). What is cosec (75° + Θ) – sec (15° – Θ) equal to?

A. 0 B. 1

C. sin Θ D. 2 cos Θ

(8). What is $\frac{(\sin\Theta+\cos\Theta)(\tan\Theta+\cot\Theta)}{\sec\Theta+cosec\,\Theta}$ equal to?

A. 1 B. 2

C. sin Θ D. cos Θ

(9). If 4 tanΘ = 3, then what is $\frac{4\,sin\Theta\,-\,cos\Theta}{4\,sin\Theta\,+\,9\,cos\Theta}$ equal to?

A. $\frac{1}{2}$ B. $\frac{1}{3}$

C. 1 4. D

(10). If tan 8 Θ = cot 2 Θ, where 0 < 8 Θ < $\frac{\pi}{2}$, then what is the value of tan 5 Θ?

A. $\frac{-1}{\sqrt{3}}$

B. $\frac{1}{\sqrt{3}}$

C. 1

D. 3

Correct Answers:

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

Explanations:

1.

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

we know that,

$\cos^2 A = 1 - \sin^2 A$

$\therefore \cos A = \sqrt{1 - \frac{9}{25}} = \sqrt{\frac{16}{25}} = \frac{4}{5}$

$\therefore \quad \tan A + \sec A = \frac{\sin A}{\cos A} + \frac{1}{\cos A}$

$= \frac{\sin A + 1}{\cos A} = \frac{\frac{3}{5} + 1}{\frac{4}{5}}$

$= \frac{8}{5} \times \frac{5}{4} = 2$

Hence, option C is correct.

2.

$\frac{\tan A - \sin A}{\sin^3 A} = \frac{\frac{\sin A}{\cos A} - \sin A}{sin3A}$

$\sin A (1 - 1) \ (1 - \cos A)$

$$= \frac{sinA\left(\frac{1}{cos\,A} - 1\right)}{\sin^3 A} = \frac{\left(\frac{(1 - cosa)}{\cos A}\right)}{\sin^2 A}$$

Hence, option C is correct.

3.

$(1 - \tan A)^2 + (1 + \tan A)^2 + (1 - \cot A)^2 + (1 + \cot A)^2$

$= 1 + \tan^2 A - 2 \tan A + 1 + \tan^2 A + 2 \tan A + 1 + \cot^2 A - 2 \cot A + 1 + \cot^2 A + 2 \cot A$

$= 1 + \tan^2 A + 1 + \tan^2 A + 1 + \cot^2 A + 1 + \cot^2 A$

$= \sec^2 A + \sec^2 A + \text{cosec}^2 A + \text{cosec}^2 A$

[$\because$ $1 + \tan^2 A = \sec^2 A$ **and** $1 + \cot^2 A = \text{cosec}^2 A$]

$= 2 (\sec^2 A + \text{cosec}^2 A)$

$$= \left[\frac{1}{\cos^2 A} + \frac{1}{\sin^2 A}\right] = 2\left[\frac{\sin^2 A + \cos^2 A}{\sin^2 A \,.\, \cos^2 A}\right]$$

$$= 2 \times \frac{1}{\sin^2 A \,.\, \cos^2 A} = 2 \sec^2 A \,.\, cosec^2 A$$

Hence, option C is correct.

4.

$\sin \alpha = \frac{\sqrt{3}}{2} \Rightarrow \sin \alpha = \sin 60° \Rightarrow \alpha = 60°$

$\cos \beta = \frac{\sqrt{3}}{2} \Rightarrow \cos \beta = \cos 30° \Rightarrow \beta = 30°$

and $\tan \gamma = 1 \Rightarrow \gamma = 45°$

$\therefore \alpha + \beta + \gamma = 60° + 30° + 45° = 135°.$

Hence, option C is correct.

5.

$\cos A + \cos^2 A = 1$

$\cos A = 1 - \cos^2 A = \sin^2 A$ ...(i)

Now, $2(\sin^2 A + \sin^4 A) = 2(\sin^2 A + \cos^2 A)$

[∵ from eq.(i) $\sin^2 A = \cos A$, then $\sin^4 A = \cos 2 A$]

$= 2 \times 1 = 2.$

Hence, option B is correct.

6.

In ΔABC, ∠C is right angled

Then,

$\angle A + \angle B + \angle C = 180°$

$\angle A + \angle B = 180° - 90° = 90°$

$\cos (A + B) + \sin (A + B)$

$= \cos 90° + \sin 90°$

$= 0 + 1 = 1.$

Hence, optiin C is correct.

7.

$\text{cosec} (75° + \Theta) - \sec (15° - \Theta)$

$= \text{cosec} (75° + \Theta) - \sec [90° - (75° + \Theta)]$

$= \text{cosec} (75° + \Theta) - \text{cosec} (75° + \Theta)$

= 0.

Hence, option A is correct.

8.

$$\frac{(\sin\Theta + \cos\Theta)(\tan\Theta + \cot\Theta)}{\sec\Theta + \ cosec\ \Theta}$$

$$= \frac{(\sin\Theta + \cos\Theta)\left(\frac{\frac{\sin\Theta}{\cos\Theta} + \cos\Theta}{\sin\Theta}\right)}{\frac{1}{\cos\Theta} + \frac{1}{\sin\Theta}}$$

$$= \frac{(\sin\Theta + \cos\Theta)\left(\frac{\sin^2\Theta + \cos^2\Theta}{\sin\Theta\,.\cos\Theta}\right)}{\frac{\sin\Theta + \cos\Theta}{\sin\Theta.cos\,\Theta}}$$

$$= (\sin\Theta + \cos\Theta)\left(\frac{1}{\sin\Theta\,.\cos\Theta}\right) \times \frac{\sin\Theta\,.\cos\Theta}{\sin\Theta + \cos\Theta}$$

= 1.

Hence, option A is correct.

9.

$4\tan\Theta = 3 \Rightarrow \tan\Theta = \frac{3}{4}$

$$\frac{4\sin\Theta - \cos\Theta}{4\sin\Theta + 9\cos\Theta}$$

[∵ Dividing numerator & denominator by sin Θ]

$$= \frac{4\left(\frac{\sin\Theta}{\cos\Theta}\right) - 1}{4\left(\frac{\sin\Theta}{\cos\Theta}\right) + 9} = \frac{4\tan\Theta - 1}{4\tan\Theta + 9} = \frac{3 - 1}{3 + 9} = \frac{2}{12} = \frac{1}{6}$$

Hence, option D is correct.

10.

tan 8Θ = cot 2Θ

tan 8Θ = tan (90 – 2Θ)

8Θ = 90 – 2Θ

10Θ = 90

Θ = 9

tan 5Θ = tan 45° = 1.

Hence, option B is correct.