

Followings are of 2 Marks each (Q01-05).

Q01. Find the degree equivalent of $\left(-\frac{21}{13}\right)$.

Q02. Let $x = \operatorname{cosec}(-870^\circ)$ and $y = \cos\left(-\frac{37\pi}{3}\right)$. Then find $(x + y)$.

OR

Evaluate : $\sin^2 \frac{7\pi}{3} + \cos^2 \frac{2\pi}{3} - \tan^2\left(-\frac{\pi}{6}\right)$.

Q03. If $k \left[\frac{\sin(\pi - x) \cos\left(\frac{\pi}{2} + x\right)}{\cos(\pi + x) \cos(-x)} \right] = \tan^2 x$, then what is the value of 'k'?

Q04. Find : $\cos(22.5^\circ) + \sin(22.5^\circ)$.

Q05. If $x = y \cos \frac{2\pi}{3} = z \cos \frac{4\pi}{3}$, then find the value of $xy + yz + zx$. [2×5 = 10]

Followings are of 3 Marks each (Q06-07).

Q06. If $\cos \theta = -\frac{5}{7}$, $\pi < \theta < \frac{3\pi}{2}$, then find the value of remaining trigonometric functions.

Q07. A train is moving on a circular curve of radius 1500 m at the rate of 66 kmph. Through what angle has it turned in 10 seconds?

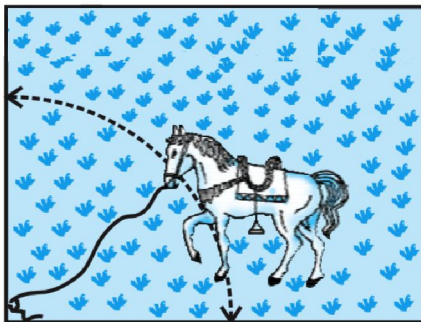
OR

Simplify : $\cos \frac{\pi}{12} + \sin \frac{\pi}{12}$. [3×2 = 6]

Following is of 4 Marks (Q08).

Q08. **CASE STUDY** : A horse is tied to a post by a rope.

The horse moves along a circular path, always keeping the rope tight and describes 88 m.



Based on the information given above, answer the following questions.

(a) When the horse traces 72° at the centre of circular path, find the length of the rope.

(b) If the angle traced by horse at the centre of circular path is $\frac{\pi}{5}$ radians and the length of the rope is found to be 35 m, find the length of arc traced. [2×2 = 4]

Followings are of 5 Marks each (Q09-10).

Q09. If $\sin x = \frac{3}{5}$, $\cos y = -\frac{12}{13}$ where $x, y \in \left(\frac{\pi}{2}, \pi\right)$, then find the value of $\tan(x + y)$.

OR

If $\tan x = -\frac{3}{4}$, $90^\circ < x < 180^\circ$, then find the value of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$.

Q10. Prove that : $\cos 10^\circ \cos 30^\circ \cos 50^\circ \cos 70^\circ = \frac{3}{16}$.

[5 × 2 = 10]

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O.P. GUPTA

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