

Review for Trig Exam #1

1. Convert from Radians/Degrees \rightarrow Degrees/Radians

$$\frac{\pi}{15} \quad \frac{\pi}{15} \cdot \frac{180^\circ}{\pi} = 12^\circ$$

$$225^\circ \quad 225^\circ \cdot \frac{\pi}{180^\circ} = \frac{5\pi}{4}$$

2. Use Reference angles to find the exact values of the following trig functions.

1) $\sin 120^\circ$

2) $\cos 240^\circ$

3) $\tan 75^\circ$

4) $\sec(-\frac{4\pi}{3})$

$\sin \theta$

$\cos \theta$

$\tan \theta$

$\sec \theta$

$+\sin 60^\circ = \frac{\sqrt{3}}{2}$

$-\cos 60^\circ = -\frac{1}{2}$

$+\tan 30^\circ = \frac{\sqrt{3}}{3}$

$-\sec \frac{\pi}{3} = -2$

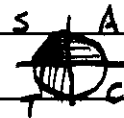


Steps to Solve

1. Find θ_r (always draw graph or loose points)
2. Determine +/-
3. Compute the value

If $\csc \theta = 3$ & $\cos \theta < 0$

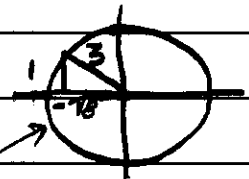
find 1) find the quadrant θ is in - QII



2) $\sin \theta = \frac{1}{3}$ $\csc \theta = 3 \Rightarrow \sin \theta = \frac{1}{3}$

3) $\cos \theta = -\frac{\sqrt{8}}{3} = -\frac{2\sqrt{2}}{3}$

$a^2 + b^2 = c^2$ $a^2 + 1^2 = 3^2$ $a^2 = 8$ $a = \sqrt{8}$



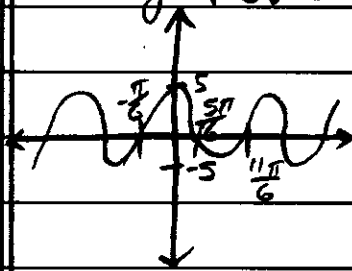
A ladder is placed against a wall, the foot of the ladder is 6 feet from the wall, with an angle of elevation $\frac{\pi}{6}$. Find the length of the ladder.



$\cos \frac{\pi}{6} = \frac{6}{x}$

$x = \frac{6}{\cos \frac{\pi}{6}} = \frac{6}{\frac{\sqrt{3}}{2}} = (6) \frac{2}{\sqrt{3}} = \frac{12}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = 4\sqrt{3} \text{ feet}$

Trig Review



1. Amplitude = 5

2. Period = $\frac{12\pi}{6} = 2\pi$

3. Phase = $-\frac{c}{b} = \frac{\pi}{6}$

4. Correct equation $y = a \sin(bx+c)$

① $y = 5 \cos(x + \frac{\pi}{6})$ ② $y = 5 \sin(x + \frac{\pi}{6})$ ③ $y = 5 \sin(x - \frac{\pi}{6})$ ④ $y = 5 \cos(x - \frac{\pi}{6})$

Verify the identity

$(\tan \theta + \cot \theta) \tan \theta = \sec^2 \theta$ | $(\tan \theta + \cot \theta) \tan \theta = \sec^2 \theta$

LS = $\tan^2 \theta + \cot \theta \tan \theta$
 $= \tan^2 \theta + 1$

$(\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta}) \frac{\sin \theta}{\cos \theta}$
 $\frac{\sin^2 \theta}{\cos^2 \theta} + 1$

RS = $\sec^2 \theta$

$\tan^2 \theta + 1$

LS = RS ✓

① Find the length of arc $s = r \cdot \theta$ (NEVER DEGREES, convert to radians)

$60^\circ \cdot \frac{\pi}{180} = \frac{\pi}{3}$ $s = r \cdot \theta$ $s = 4 \cdot \frac{\pi}{3}$ $s = \frac{4\pi}{3}$

② Find the area $A = \frac{1}{2} r^2 \theta$ $A = \frac{1}{2} (4)^2 (\frac{\pi}{3}) = \frac{8\pi}{3}$

Verify the Identity ^{compute} $\tan(-\theta) \cdot \sin(-\theta) + \cos(-\theta) = \sec \theta$

LS = $(-\tan \theta)(-\sin \theta) + \cos \theta$

$= \tan \theta \sin \theta + \cos \theta$

$= \frac{\sin \theta}{\cos \theta} \cdot \sin \theta + \cos \theta$

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

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

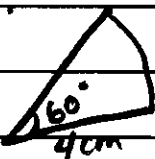
$= \frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta}$

$= \frac{1}{\cos \theta}$

$= \sec \theta$

RS = $\sec \theta$

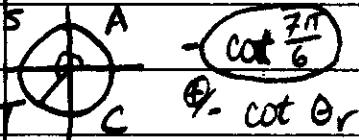
LS = RS ✓



Trig Review

Find the exact value of the following using formulas for negatives

① $\cot(-\frac{7\pi}{6})$



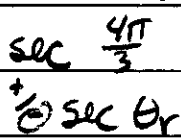
$-\cot \frac{7\pi}{6}$

$-\cot \theta_r$

$-\cot \frac{\pi}{6}$

$-\sqrt{3}$

② $\sec(-\frac{4\pi}{3})$



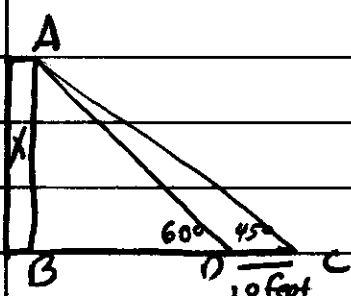
$\sec \frac{4\pi}{3}$

$-\sec \theta_r$

$-\sec \frac{\pi}{3}$

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A person looks at the top of a tower from where he stands the angle of elevation is 45° . He walks toward the tower 10 feet closer, the angle of elevation becomes 60° . How tall is the tower?



ΔABC
 $\tan 45^\circ = \frac{x}{BC}$
 $1 = \frac{x}{BD+10}$

ΔABD
 $\tan 60^\circ = \frac{x}{BD}$
 $\sqrt{3} = \frac{x}{BD}$
 $BD = \frac{x}{\sqrt{3}}$
 $1 = \frac{x}{BD+10}$

$1 = \frac{x}{\frac{x}{\sqrt{3}} + 10}$
 $x = \frac{x}{\sqrt{3}} + 10$
 $x - \frac{x}{\sqrt{3}} = 10$
 $x(1 - \frac{1}{\sqrt{3}}) = 10$
 $x = \frac{10}{1 - \frac{1}{\sqrt{3}}} = \frac{10}{\frac{\sqrt{3}-1}{\sqrt{3}}} = (10) \frac{\sqrt{3}}{\sqrt{3}-1}$
 $x = 23.66 \text{ feet}$