

# MATH 119: Quiz 4

Name: Key

Directions:

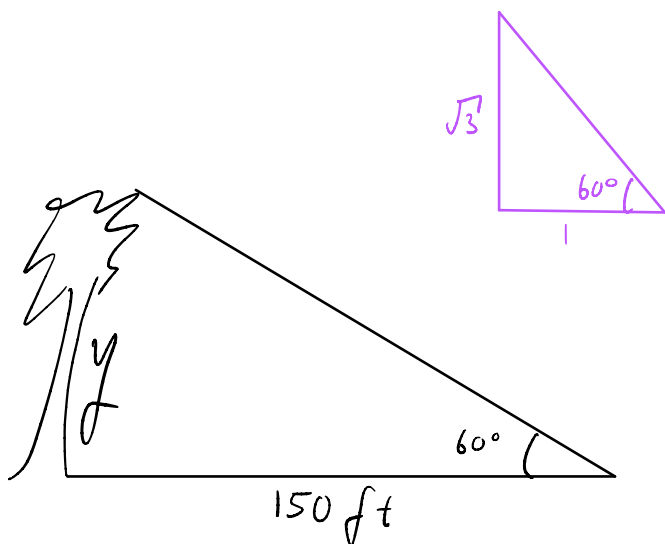
- \* Show your thought process (commonly said as "show your work") when solving each problem for full credit.
- \* If you do not know how to solve a problem, try your best and/or explain in English what you would do.
- \* Good luck!

1. If a ball is in circular motion and completes  $\frac{1}{12}$  revolutions per second, find the angular speed (in radians per minute).

convert  $\frac{\text{rev}}{\text{sec}} \rightarrow \frac{\text{rad}}{\text{min}}$

$$\omega = \frac{1}{12} \frac{\cancel{\text{rev}}}{\cancel{\text{sec}}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{2\pi \text{ rad}}{1 \cancel{\text{rev}}} = 10\pi \text{ rad/min.}$$

2. A sequoia tree casts a shadow 150 feet long. Find the height of the tree if the angle of elevation of the sun is  $60^\circ$ .



$$\tan(60^\circ) = \frac{y}{150}$$

$$y = 150 \cdot \tan(60^\circ) = 150 \cdot \sqrt{3} \text{ ft}$$

3. Simplify:

$$\frac{\sin x \sec x}{\tan x} = \frac{\sin x \frac{\sin x \sec x}{\tan x}}{\frac{\sin x}{\cos x}} = \frac{\frac{\sin x}{\cos x}}{\frac{\sin x}{\cos x}} = \boxed{1}$$

4. Prove:

$$\frac{\cos \theta \sec \theta}{\tan \theta} = \cot \theta$$

$$\begin{aligned} \text{LHS} &= \frac{\cos \theta \sec \theta}{\tan \theta} \\ &= \frac{\cancel{\cos \theta} \cdot \frac{1}{\cancel{\cos \theta}}}{\frac{\sin \theta}{\cos \theta}} \\ &= \frac{1}{\frac{\sin \theta}{\cos \theta}} \\ &= 1 \cdot \frac{\cos \theta}{\sin \theta} \end{aligned}$$

$$= \cot \theta$$

$$= \text{RHS} \quad \square$$