

MATH 119: Quiz 4

Name: Key

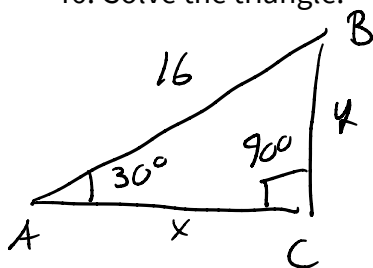
Directions: No technology, internet, or notes. Do everything by hand. If you have a question, ask me. Good luck!

1. Convert the following to radians:

$$(a) 30^\circ \cdot \frac{\pi}{180} = \frac{30\pi}{180} = \frac{3 \cdot \cancel{10} \cdot \pi}{\cancel{18} \cdot \cancel{10}} = \frac{3 \cdot \pi}{6 \cdot \cancel{3}} = \frac{\pi}{6}$$

$$(b) -120^\circ \cdot \frac{\pi}{180} = \frac{-120\pi}{180} = \frac{-\cancel{6} \cdot \cancel{2} \cdot \cancel{10} \cdot \pi}{\cancel{6} \cdot \cancel{3} \cdot \cancel{10}} = -\frac{2\pi}{3}$$

2. Suppose ABC is a right triangle where $\angle A = 30^\circ$, $\angle C = 90^\circ$. The hypotenuse \overline{AB} has length 16. Solve the triangle.



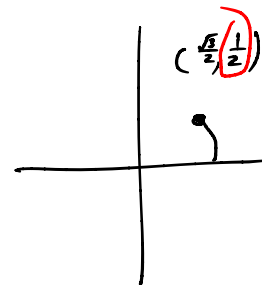
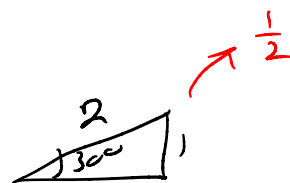
Sum of angles in Δ is 180° . So

$$180^\circ = 30^\circ + 90^\circ + \angle B$$

$$\angle B = 180^\circ - 30^\circ - 90^\circ$$

$$= 180^\circ - 120^\circ$$

$$= 60^\circ$$



To find y , use \sin .

$$\sin(30^\circ) = \frac{y}{16} \Rightarrow y = 16 \sin(30^\circ) = 16 \cdot \frac{1}{2} = 8$$

To find x , use \cos :

$$\cos(30^\circ) = \frac{x}{16} \Rightarrow x = 16 \cos(30^\circ) = 16 \cdot \frac{\sqrt{3}}{2} = 8\sqrt{3}$$

remember to simplify.

3. Suppose the displacement of a spring follows the equation

$$f(t) = 2 \sin(2\pi t)$$

where t is measured in seconds.

(a) What is the frequency of the spring?

$$f_{\text{req}} = \frac{\omega}{2\pi}, \quad \omega = 2\pi \quad \text{so} \quad f_{\text{req}} = \frac{2\pi}{2\pi} = 1 \text{ Hz}$$

don't forget units

(b) How far is the spring displaced at $t = \frac{1}{6}$ seconds?

$f(\frac{1}{6})$ tells us how far the spring has displaced at $t = \frac{1}{6}$ since f tells us displacement.

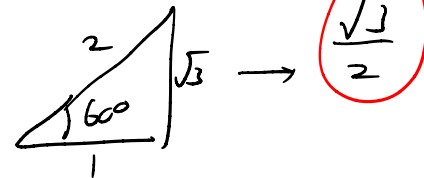
$$\text{So } f(\frac{1}{6}) = 2 \sin(2\pi \cdot \frac{1}{6})$$

$$= 2 \sin\left(\frac{\pi}{3}\right)$$

$$= 2 \frac{\sqrt{3}}{2}$$

$$= \sqrt{3}$$

$$\frac{\pi}{3} \cdot \frac{180}{\pi} = 60^\circ$$



$$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$$