Lesson 9 Practice Problems

1. Which statement is *not* true for the function f given by $f(\theta) = \sin(\theta)$, for values of θ between 0 and 2π?

   A. The outputs of the function range from -1 to 1.

   B. $\sin\theta = 1$ only when $\theta = \frac{\pi}{2}$

   C. $\sin\theta = 0$ only when $\theta = 0$
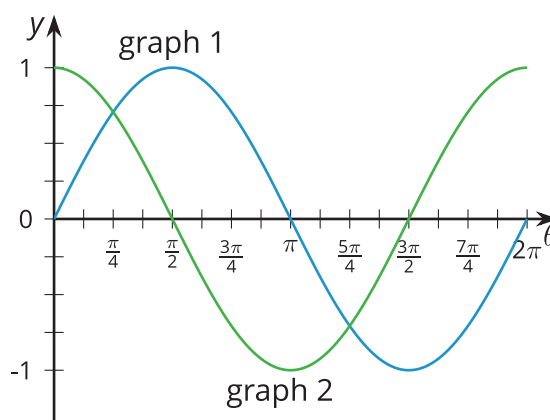
   D. $\sin\theta > 0$ for $0 < \theta < \pi$

2. Angle θ, measured in radians, satisfies $\cos(\theta) = 0$. What could the value of θ be? Select **all** that apply.

   A. 0

   B. $\frac{\pi}{4}$

   C. $\frac{\pi}{2}$

   D. π

   E. $\frac{3\pi}{2}$

3. Here are the graphs of two functions.

   a. Which is the graph of $y = \cos(\theta)$? Explain how you know.

   b. Which is the graph of $y = \sin(\theta)$? Explain how you know.

4. Which statements are true for *both* functions $y = \cos(\theta)$ and $y = \sin(\theta)$? Select **all** that apply.

A. The function is periodic.

B. The maximum value is 1.

C. The maximum value occurs at $\theta = 0$.

D. The period of the function is 2π.

E. The function has a value of about 0.71 when $\theta = \frac{\pi}{4}$.

F. The function has a value of about 0.71 when $\theta = \frac{3\pi}{4}$.

5. Here is a graph of a function f.
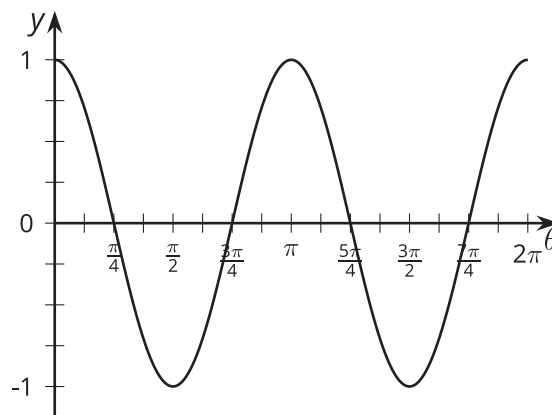
The function f is either defined by $f(\theta) = \cos^2(\theta) + \sin^2(\theta)$ or $f(\theta) = \cos^2(\theta) - \sin^2(\theta)$. Which definition is correct? Explain how you know.

6. The minute hand on a clock is 1.5 feet long. The end of the minute hand is 6 feet above the ground at one time each hour. How many feet above the ground could the center of the clock be? Select **all** that apply.

A. 4.5

B. 5

C. 6

D. 7

E. 7.5

(From Unit 6, Lesson 7.)

7. Here is a graph of the water level height, h, in feet, relative to a fixed mark, measured at a beach over several days, d.
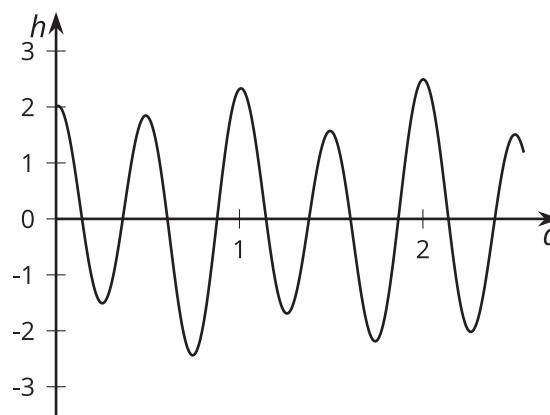
a. Explain why the water level is a function of time.

b. Describe how the water level varies each day.

c. What does it mean in this context for the water level to be a periodic function of time?

(From Unit 6, Lesson 8.)