Unit 6 Lesson 14: Transforming Trigonometric Functions

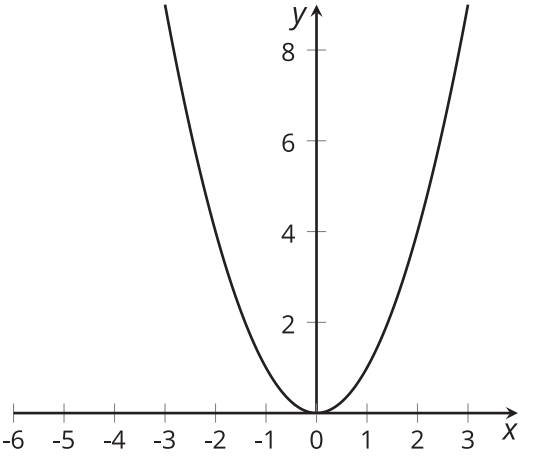
1 Translated Parabolas (Warm up)

Student Task Statement

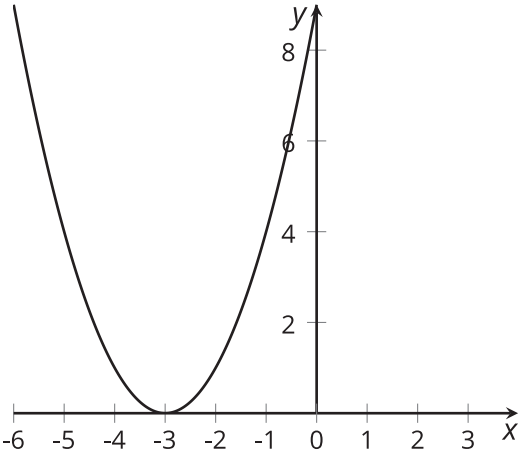
Match each equation with its graph. Be prepared to explain your reasoning.

1. $y = x^2$
2. $y = (x - 1)^2$
3. $y = (x + 3)^2$

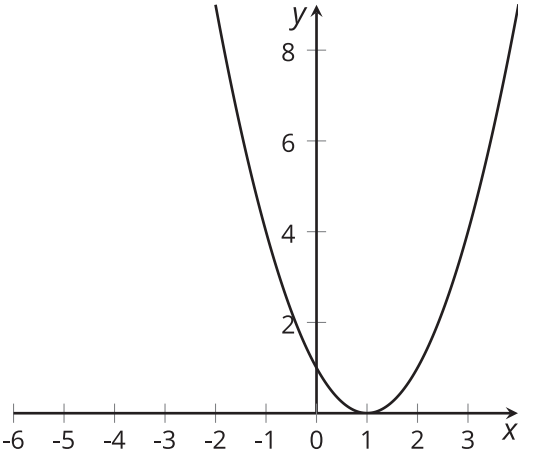
A



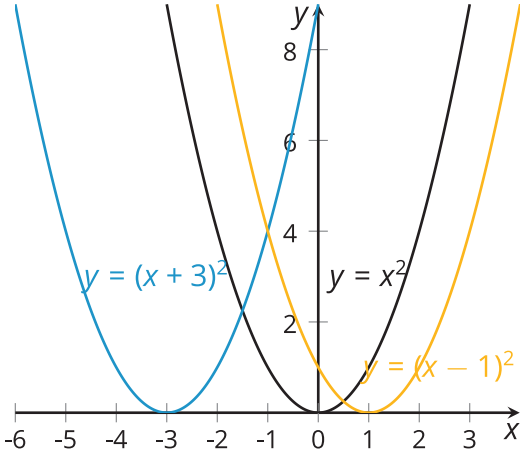
B



C

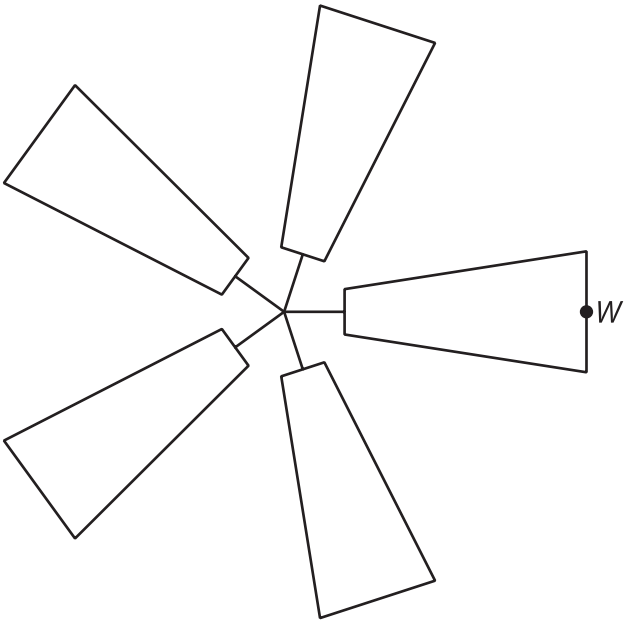


Activity Synthesis



2 Windmills Everywhere

Images for Launch



Student Task Statement

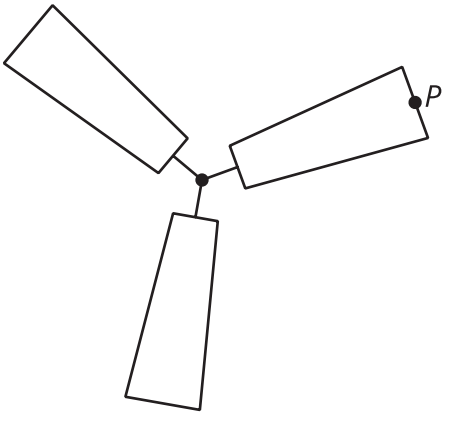
Here are three equations for three different windmills. Each equation describes the height h, in feet above the ground, of a point at the tip of a blade of a different windmill. The point is at the far right when the angle θ takes the value 0. Describe each windmill and how it is spinning.

1. $h = 2.5\sin(\theta) + 10$
2. $h = \frac{4}{5}\sin(\theta) + 3$
3. $h = \text{-}1.5\sin(\theta) + 5$

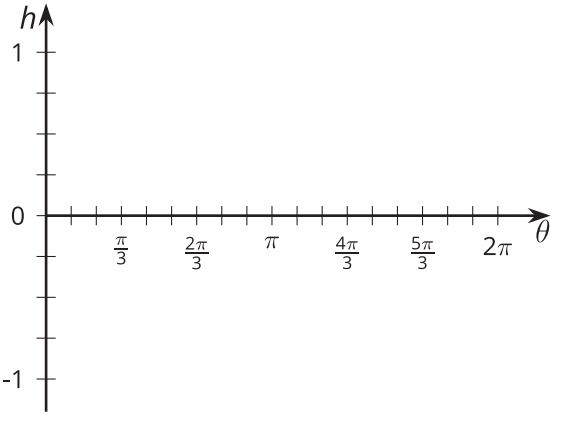
3 Spinning Fan

Student Task Statement

A fan has radius 1 foot. A point P starts in the position shown in the picture. The center of the fan is at $(0, 0)$ and the point P is at the $\frac{\pi}{6}$ position on the circle. The fan turns in a counterclockwise direction.

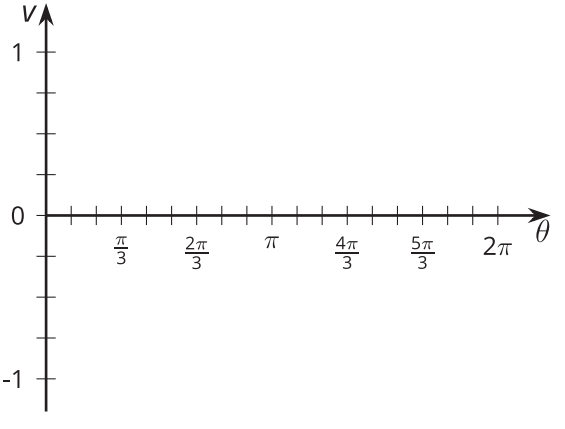


1. Sketch a graph of the horizontal position h, in feet, of P as a function of the angle of rotation θ of the fan from its starting position.



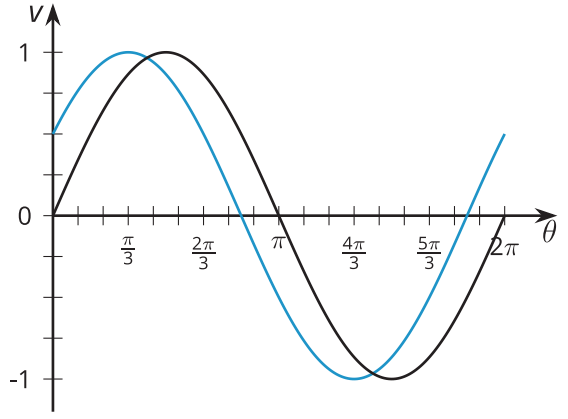
2. How does this graph compare to the graph of $h = \cos(\theta)$?

3. Sketch a graph of the vertical position v, in feet, of P as a function of the angle of rotation θ of the fan.



4. How does this graph compare to the graph of $v = \sin(\theta)$?

Activity Synthesis



Images for Activity Synthesis