## 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. $y=\left(x−1\right)^{2}$
3. $y=\left(x+3\right)^{2}$

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. $h=2.5sin\left(θ\right)+10$
2. $h=\frac{4}{5}sin\left(θ\right)+3$
3. $h=-1.5sin\left(θ\right)+5$

### 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 $\left(0,0\right)$ and the point $P$ is at the $\frac{π}{6}$ 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.
* 
1. How does this graph compare to the graph of $h=cos\left(θ\right)$?
2. Sketch a graph of the vertical position $v$, in feet, of $P$ as a function of the angle of rotation $θ$ of the fan.
* 
1. How does this graph compare to the graph of $v=sin\left(θ\right)$?

#### Activity Synthesis



#### Images for Activity Synthesis







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