Algebra 2/ with Trig

10.2 Translate and Reflect Trigonometric Graphs

Warm-Up:

**Describe the translation of the graph of** *y =* *x*2 **that produces the graph of the given function.**

**1.** $y = x^{2} + 2$ **2.** $ y = x^{2} – 5$

**3.** $y = \left(x – 1\right)^{2} $**4.** $y = \left(x + 3\right)^{2}+ 4$

--------------------------------------------------------------NOTES-----------------------------------------------------------------------------------------

Example 1: Graph a Vertical Translation Example 2: Graph a Horizontal Translation

**Graph** $y = 2 sin 4x + 3$**. Graph** $y = 5 cos 2(x – 3π ).$

Amplitude: Amplitude:

Period: Period:

Horizontal Shift: Vertical Shift: Horizontal Shift: Vertical Shift:

Five Key Points on $y=k$: Five Key Points on $y=k$:

Maximum: Maximum:

Minimum: Minimum:

 

Example 3: Graph a Model for Circular Motion

**Suppose you are riding a Ferris wheel that turns for** 180seconds**. Your height** *h***(in feet) above the ground at any time** *t* **(in seconds) can be modeled by the equation**

1. **Graph your height above the ground as a function of time.**

**b. What are your maximum and minimum heights?**

YOU TRY: **Graph the function.**

1. $y = cos x + 4.$2. $y=3sin(x-\frac{π}{2})$

Amplitude: Amplitude:

Period: Period:

Horizontal Shift: Vertical Shift: Horizontal Shift: Vertical Shift:

Five Key Points on $y=k$: Five Key Points on $y=k$:

Maximum: Maximum:

Minimum: Minimum:

 

YOU TRY: Example 4: Combine a Translation and Reflection

*3.* $f(x) sin (x + π) – 1$$y=-2sin\frac{2}{3}(x-\frac{π}{2})$

Amplitude: Amplitude:

Period: Period:

Horizontal Shift: Vertical Shift: Horizontal Shift: Vertical Shift:

Five Key Points on $y=k$: Five Key Points on $y=k$:

Maximum: Maximum:

Minimum: Minimum:

 

YOU TRY: **Graph the function.**

4. $y=-cos⁡(x+\frac{π}{2})$ 5. $y=-3sin\frac{1}{2}x+2$

Amplitude: Amplitude:

Period: Period:

Horizontal Shift: Vertical Shift: Horizontal Shift: Vertical Shift:

Five Key Points on $y=k$: Five Key Points on $y=k$:

Maximum: Maximum:

Minimum: Minimum:



KEEP GOING:

1. **The depth** *d* **(in feet) of a boat’s propeller after** *t* **seconds can be modeled by a function that represents the graph of**

$$d=7cos⁡(\frac{550}{3}πt)$$

**translated up** 24 **units then reflected in the line** *y =* 24**. Write an equation for the model and graph the model.**



1. **A drawbridge spans** 150 **feet. When the bridge is fully open, each section rises** 43 **feet from the horizontal. Write a model that gives the distance** *d* **(in feet) of each section from its highest point as a function of the angle of elevation.**

Hw: Section 10.2 p.623 #3-31 every other odd