hmwk: pg 360 # 1, 2, 6, 7, 9

**Modelling with Trigonometric Functions**

**Recall:**

For sinusoidal functions....

* k is obtained from the period or frequency: $k=\frac{2π}{T}$ or $k=2πf$

 \* It is rare to ever use a negative value for k when

 modelling real-life scenarios.

* d is the phase shift or horizontal shift to the left side of the box enclosing one cycle of the sinusoidal function.
* |a| is the amplitude of the function.

 \* Sometimes we use a negative value for ‘a’ in situations when it is

 convenient to do so; ie… to eliminate a phase shift.

* c is the location of the axis of equilibrium.

**Example 1**

Renee DesCartes boards the Pythagorean Ferris Wheel at 9:00 am. The base of the wheel is 2 m above ground. The diameter of the wheel is 30 m. If it takes 5 minutes for the wheel to complete one full revolution, what is Renee's height above the ground at 9:09 am?

Notice to solve the problem in example 1, we did the following:

1. Create a sketch of a sinusoidal graph to model the scenario.

2. Put a box around one cycle of a sine or cosine period then determine the

 parameters k, d, a, and c.

3. Create the sinusoidal function using your values of k, d, a, and c.

4. Plug in a value for one of the two variables and solve.

**Example 2**

The tides at Cape Capstan change the depth of the water in the harbour. On one day in October, the tides have a high point of approximately 10 m at 2 pm and a low point of 1.2 m at 8:15 pm. A particular sailboat has a draft of 2m; this means it can only move in water that is at least 2 m deep.

a) The captain of the sailboat plans to exit the harbour at 6:30 pm. Is this safe?

b) When is it safe to return?