TASK: Now that we have worked with graphs of trig functions for almost 2 weeks, we can analyze real world situations and use trig modeling. The five questions below require you to use your understanding of Sine and Cosine equations to model a real world scenario. Some suggestions are below as you complete each. The answers are linked to the right (click the icon).

- You may want to draw out the scenario to help identify each value in the equation
- You may need to review what the key features mean - for example, period is the length of one curve. If I was working on a problem using the distance of the sun in the sky over the course of 1 day, the period is 24 hours.

1. In Johannesburg in June, the daily low temperature is usually around 3°C , and the daily high temperature is around 18°C. The temperature is typically halfway between the daily high and daily low at both 10 am and 10 pm, and the highest temperatures are in the afternoon. Write a trigonometric function that models the temperature T in Johannesburg t hours after midnight.	
2. The hottest day of the year in Santiago, Chile, on average is January 7, when the average high temperature is 29°C. The coolest day of the year has an average high temperature of 14°C. Use a trigonometric function to model the temperature in Santiago, Chile, using 365 days as the length of a year. Remember that January 7 is in the *summer* in Santiago.	
3. The tides in a particular bay can be modeled with an equation of the form $d = A\ \text{Cos}\ (B\text{t}) + C$, where t represents the number of hours since high-tide and d represents the depth of water in the bay. The maximum depth of water is 36 feet, the minimum depth is 22 feet and high-tide is hit every 12 hours. Determine the values of A, B, and C in the model.	 [PAGE 4]
4. The voltage used by most households can be modeled by a sine function. The maximum voltage is 120 volts, and there are 60 cycles *every second*. Which equation best represents the value of the voltage as it flows through the electric wires, where t is time in seconds? (1) V = 120 sin (t) (2) V = 120 sin ($60t$) (3) V = 120 sin ($60\pi t$) (4) V = 120 sin ($120\pi t$)	 [PAGE 9]
5. An athlete was having her blood pressure monitored during a workout. Doctors found that her maximum blood pressure, known as systolic, was 110 and her minimum blood pressure, known as diastolic, was 70. If each heartbeat cycle takes 0.75 seconds, then determine a sinusoidal model, in the form $y = A\ Sin\ (Bt) + C$, for her blood pressure as a function of time t in seconds.	 [QUES 3]