**Activity**

In this activity, you will be asked to (1) label an application problem with the most appropriate function type, (2) find an algebraic representation for the application, (3) sketch a graph for your algebraic representation of the function with a contextually-appropriate domain, (4) identify what other information you have and what you are finding, and (5) show your work and explanation for the answer to the problem. Each problem has five function types from which to choose.

1. Asa’s Alpaca Yarn sells alpaca fiber in yarn form. These mammals, which are slightly smaller than llamas, are shorn once per year during the mid-Spring. In the mid-Fall of each year, Asa has their highest selection of yarn available at 400 skeins (a ball of yarn), after working all summer to turn all of the shorn fiber into yarn. By the following mid-Spring and lots of sales, Asa’s inventory is usually down to about 50 skeins, in time for the Alpaca to be shorn again. Assuming that it is now mid-Spring, determine how many skeins will be sold over the next 2.5 years. Use one of the following function types:
   1. Absolute Value
   2. Polynomial
   3. Sine
   4. Cosine
   5. Piecewise (specify each piece’s function and domain)
2. You work for the City of Norman’s Parks & Recreation Department in Norman, OK. The weather pattern we are about to see in the next few weeks mimics a rainy weather pattern from a few years ago, and your boss has asked that you estimate the level of Lake Thunderbird for the next month so that determinations can be made about closing the campsites closest to the water on certain dates. The water level right now is comparable to before the previous similar weather pattern. The following table includes data from that time:

| Date | Apr 25, 2019 | Apr 29, 2019 | Apr 30, 2019 | May 02, 2019 | May 07, 2019 | May 11, 2019 | May 14, 2019 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Gage height, ft | 1039.64 | 1040.78 | 1041.37 | 1041.13 | 1039.08 | 1039.46 | 1039.15 |

| Date | May 16, 2019 | May 17, 2019 | May 19, 2019 | May 24, 2019 | May 25, 2019 | May 27, 2019 | May 28, 2019 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Gage height, ft | 1039 | 1039.8 | 1039.95 | 1039.7 | 1039.56 | 1039.48 | 1039.36 |

Your department must close the campsites closest to the water when the gage height is projected to be above 1039.8 feet. Given that the campsite creates a lot of revenue this time of year, you want to make sure that it is open as much as possible without being dangerous for campers. If today is May 1, 2021, the first day of the same weather pattern which began Apr 25, 2019, what days would you suggest to close the campsites closest to the water for the safety of campers? Hint: The data in the table, both dates and gage height in feet, are not the numbers you’d use for a model of this situation. Think about what you need to do with the dates given so they are useful as inputs. Similarly, think about what you need to do with the gage height in feet so they are useful as outputs.

* 1. Linear
  2. Absolute Value
  3. Sine
  4. Cosine
  5. Polynomial