**Practice Exercises:**

**Exercise 1:** Create a “Table of Values” for each of the toolkit functions using at least 5 values of x. Then construct your own graph. Does your graph resemble the ones in this section? Make sure to select both positive and negative x values ***when appropriate*** in order to practice calculator operations with negative numbers. [When are negative values of x not appropriate?]

**Exercise 2:** Given a ball thrown vertically upward according to the formula

1. A line is ***tangent*** to the curve at x = 0.5 seconds. What is the y coordinate of the point where the tangent line and the curve intersect?
2. A line is ***secant*** to the curve and passes through (1, \_\_\_\_ ) and (0, \_\_\_\_\_ ). What are the y coordinates of the two points?
3. Find the slope of the secant line in b)
4. Use this number to estimate the speed of the ball at 0.5 seconds.
5. Is this a “reliable” estimate, given that the actual speed of the ball is 22.3 meters/second, 0.5 second after being thrown?

**Exercise 3:** What is the slope of the secant line through the given two points for , where the two points are

1. the point (3, 9) and a second point with x = 2.97
2. the point (3, 9) and a second point with x = 3.02

Use this information to estimate the slope at x = 3

Sketch the graph of for x between 2 and 4

**Exercise 4:** What is the slope of the line through the given two points for

, where the two points are

1. the point (2, 4) and a second point with x = 1.97
2. the point (2, 4) and a second point with x = 2.02

Use this information to estimate the slope at x = 2

Sketch the graph of for x between 1 and 3

**Exercise 5:** Here we see a temperature graph on a certain day in May in Boston.

1. **Chart, line chart

   Description automatically generated**What was the average change in temperature from 9 am to 3 pm?
2. Estimate how the temperature was changing (in ) at 10 am?
3. Same question but at 6 pm?

**Exercise 6:** A person standing at the side of a road was measuring the distance between themselves and a car that was traveling on a straight road.

1. Chart, line chart

   Description automatically generatedWhere was the car in relation to the person at the start?
2. What are the units of velocity/speed on this graph?
3. What was the average velocity of the car from 0 seconds to 30 seconds?
4. What was the average velocity of the car from 10 seconds to 25 seconds?
5. Estimate how fast the car was traveling at
   1. 10 seconds?
   2. 18 seconds?
   3. 25 seconds? (Hint: slope will be a negative number. To get speed, make it positive)
6. What is happening between 15 seconds and 20 seconds?
7. Velocity is negative, while speed is positive between 20 seconds and about 27 seconds. Why? What does this mean? Hint: Look at how the distance between the car and the observer is changing.

**Exercise 7:** Fill in the table with appropriate units for .

|  |  |  |
| --- | --- | --- |
| Units for x | Units for y = f(x) | Units for |
| hours | miles |  |
| vehicles | people |  |
| dollars | bottles of water |  |
| days | birds (migrating) |  |
| hours | miles per hour |  |
| minutes | gallons |  |
| ounces | dollars |  |