Lesson 3.5- Slope in context

Aim: I can interpret the slope of a linear function in context

Warm Up:

1) Write the equation of the line that has a y-intercept of 3 and an x-intercept of -6
   \[ y = \frac{1}{2} x + 3 \]

2) Write the equation of the line that goes through (3, 8) and is parallel to \( y = 3x + 4 \)
   \[ m = 3 \]
   \[ y = 3x - 1 \]
Linear Functions

Return to Problem #9 from Unit 2 Test:
Bart is starting an exercise program. The first day he will spend 30 minutes on a treadmill. He will increase his time on the treadmill by 2 minutes each day after that. Write a function $T(d)$ to represent the situation.

\[ f(x) = mx + b \]
\[ f(x) \quad \text{"f of x"} \quad f(y) \]

\[ \text{input} \quad d = \# \text{ of days} \]
\[ \text{Output} \quad T(d) = \text{time} \]

\[ T(d) = 30 + 2(d-1) \]

\[ T(1) = 30 + 2(1-1) = 30 \quad T(1) = 30 \]

\[ T(8) = 30 + 2(8-1) \]
\[ T(8) = 44 \]

Amount of minutes on a day.
Explore: Modeling Slope

During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

\[
\text{What does slope represent?} \quad \frac{2\text{ in}}{4\text{ hr}} = \frac{1\text{ in}}{2\text{ hr}} = 0.5\text{ in/ hr}
\]

\[m = \frac{1}{2} \text{ inch per hour}\]
SLOPE IN CONTEXT

Slope is the rate of change!

*First need to identify the independent and dependent variables.

\[
\frac{\text{output (y)}}{\text{input (x)}} \quad \text{per} \quad \text{Ex: inches per hour}
\]
3.5 Classwork: Slope in Context

1) The graph pictured shows how much money Natalie charges when she is tutoring math to her neighbors.

   A) What is the slope of the line? \[ \frac{375}{20} \]

   B) What does the slope of this line represent? \$18.75 per hour

2) Each day Toni records the height of a plant for her science lab. Her data are shown in the table below.

<table>
<thead>
<tr>
<th>Day (0)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (cm)</td>
<td>3.0</td>
<td>4.5</td>
<td>6.0</td>
<td>7.5</td>
<td>9.0</td>
</tr>
</tbody>
</table>

If Toni plots her data as a line in the coordinate plane, what is the slope of her line and what does it represent?

1.5 cm per day

3) A landscaper planted a baby maple tree in a garden. He kept track of its growth as he landscaped the rest of the garden. After 2 weeks the tree was 48 inches. After 6 weeks, the tree was 62 inches tall. If he were to graph these data, what would the slope of the line represent in the context of the problem?

4) The graph below shows the relationship of cost, \( c \), and pounds of tomatoes, \( x \), at a Farm Stand. Grinstead Supermarket says that they have a lower cost per pound of tomatoes than Farm Stand 1. Which equation could represent the cost of tomatoes at Grinstead?

   a) \( c = 3x \)
   b) \( c = 4.50x \)
   c) \( c = 5.50x \)
   d) \( c = x \)

   Explain your answer choice.

5) The graph below shows a linear relationship between a candle’s height and the amount of time it is burning. What does the slope of the line represent in the context of the problem?

6) A driver leaves home for a business trip and drives at a constant speed of 60 miles per hour for 2 hours. Her tire goes flat, and she spends 30 minutes changing the tire. She resumes driving and drives at 30 miles per hour for the remaining one hour until she reaches her destination.

   On the set of axes below, draw a graph that models the driver’s distance from home.
<table>
<thead>
<tr>
<th>#</th>
<th>Title</th>
<th>Key Takeaway</th>
<th>HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5</td>
<td>Slope in context</td>
<td>What does the slope represent in the context of a problem?</td>
<td>HW 3.5</td>
</tr>
</tbody>
</table>

Delta!