Find the slope of each line.

1) \[-\frac{1}{3}\]
2) \[\frac{3}{2}\]
3) \[-\frac{3}{2}\]
4) \[\frac{3}{2}\]
5) \[\frac{5}{3}\]
6) \[\frac{7}{3}\]
7) \[-3\]
8) \[\frac{7}{3}\]
Find the slope of the line through each pair of points.

9) \( (8, 10), (-7, 14) \) \[ \frac{-4}{15} \]

10) \( (-3, 1), (-17, 2) \) \[ \frac{-1}{14} \]

11) \( (-20, -4), (-12, -10) \) \[ \frac{-3}{4} \]

12) \( (-12, -5), (0, -8) \) \[ -\frac{1}{4} \]

13) \( (-19, -6), (15, 16) \) \[ \frac{11}{17} \]

14) \( (-6, 9), (7, -9) \) \[ -\frac{18}{13} \]

15) \( (-18, -20), (-18, -15) \) \[ \text{undefined} \]

16) \( (12, -18), (11, 12) \) \[ -30 \]

Find the slope of each line.

17) \( y = -5x - 1 \) \[ -5 \]

18) \( y = \frac{1}{3}x - 4 \) \[ \frac{1}{3} \]

19) \( y = -\frac{1}{5}x - 4 \) \[ -\frac{1}{5} \]

20) \( x = 1 \) \[ \text{undefined} \]

21) \( y = \frac{1}{4}x + 1 \) \[ \frac{1}{4} \]

22) \( y = -\frac{2}{3}x - 1 \) \[ -\frac{2}{3} \]

23) \( y = -x + 2 \) \[ -1 \]

24) \( y = -x - 1 \) \[ -1 \]

25) \( 2x + 3y = 9 \) \[ -\frac{2}{3} \]

26) \( 5x + 2y = 6 \) \[ -\frac{5}{2} \]
1. The following represents the graph for a helium balloon’s flight.
   a. Determine the rate of change of the graph.
      \[ \text{1000} \]
   b. What does this slope (rate of change) mean?
      \[ \text{The balloon rises 1000 ft each minute.} \]
   c. When is the balloon at 5000 ft? Show this on your graph.
      \[ \text{5 min} \]
   d. How high is the balloon off the ground at 2 seconds? Show this on your graph
      \[ \text{2000 ft} \]
   e. Although not on the graph, when will the balloon reach 10000 feet? Show your reasoning
      \[ \text{10 minutes} \]

2. The following represents the balance in Brady’s savings account.
   a. Find the slope of the graph.
      \[ \text{100} \]
   b. What does the slope represent as a rate of change?
      \[ \text{Brady saves$100 a month.} \]
   c. How much did Brady deposit when he opened the account?
      \[ \text{$300} \]
   d. At this rate how much money will Brady have in his account after 15 months? Show your reasoning.
      \[ \text{$1800 in his account} \]
   e. If Brady deposited $500 to begin with, but continued to deposit the same amount each month what would this graph look like? Sketch it on the graph.
   f. If Brady deposited $300 initially, but spent it all in five months show this on the graph?
   g. What would the slope of this line be? What does the negative sign indicate?
3. Rojen makes $7 per hour babysitting. Create a table of values and graph for this scenario.

a. Find the rate of change of the graph.

<table>
<thead>
<tr>
<th>Time (h)</th>
<th>Money Made ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>5</td>
<td>35</td>
</tr>
</tbody>
</table>

b. What does it represent?

The amount she makes per hour.

4. If it costs $25 to rent a car and 0.10 cents per kilometer drive create a graph for the scenario.

HINT: Even if you do not drive the car off the lot it will still cost you $25.

a. Find the rate of change of this graph.

b. What does it represent?

The extra cost per mile.

HINT: Value with no miles driven.

c. What is the value on the y-axis? How does it relate to the scenario?

$25 → value with no miles driven.

d. If you paid the same fee to rent the car ($25), but more per kilometer what would this look like? Sketch it on the graph.

The slope would be steeper on the graph.
5.a. What is the slope of this graph?  

b. Interpret this slope as a rate of change.

0 books per week after first one

c. Explain this rate of change in words.
This person has read one book but has not continued to read.
d) How many books has this person read in:
a. 2 weeks  b. 8 weeks

6.a. What is the slope of this graph?

\[
\frac{3}{2}
\]

b. Interpret the slope as a rate of change.

$3 for every 2 mins

c. What is the cost if the distance is zero?

$15

d. Create a scenario to match this graph.

*Answers may vary*

(come up with your own)
Word problems involving rate of change

1. When the dependent variable increases when the independent variable increases, the rate of change is (Positive, negative, zero, undefined) circle one.

2. When the dependent variable stays the same as the independent variable increases, the rate of change is (Positive, negative, zero, undefined) circle one.

3. When the dependent variable decreases as the independent variable increases, the rate of change is (Positive, negative, zero, undefined) circle one.

4. When the dependent variable increases as the independent variable stays the same, the rate of change is (Positive, negative, zero, undefined) circle one.

Find the rate of change
Hint: word problems are units. Identify what you are given and determine the unit and the time.
Write the ordered pair (time, units).

5. \((20, 35), (25, 40)\)

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>35</td>
</tr>
<tr>
<td>25</td>
<td>40</td>
</tr>
</tbody>
</table>

6. A climber is on a hike. After 2 hours he is at an altitude of 400 feet. After 6 hours, he is at an altitude of 700 feet. What is the average rate of change? 
   \[\text{Roc} = \frac{750 \text{ft}}{4 \text{hr}} = \frac{187.5 \text{ft}}{\text{hr}}\]

7. A scuba diver is 30 feet below the surface of the water 10 seconds after he entered the water and 100 feet below the surface after 40 seconds. What is the scuba divers rate of change?
   \[\text{Roc} = \frac{-70 \text{ft}}{30 \text{sec}} = -\frac{7}{3} \text{ft/sec}\]

8. A rocket is 1 mile above the earth in 30 seconds and 5 miles above the earth in 2.5 minutes. What is the rocket's rate of change in miles per second? What about miles per minute?
   \[\text{Roc} = \frac{1 \text{mi}}{30 \text{sec}} = \frac{2}{3} \text{mi/min}\]

9. A teacher weighed 145 lbs in 1986 and weighs 190 lbs in 2007. What was the rate of change in weight?
   \[\text{Roc: } 15 \text{ lbs per 21 yrs}\]

10. Over the last 50 years, the average temperature has increased by 2.5 degrees worldwide (I made this up). What is the rate of change in worldwide temperatures per year? 1 degree every 20 yrs

11. Michael started a savings account with $300. After 4 weeks, he had $350 dollars, and after 9 weeks, he had $400. What is the rate of change of money in his savings account per week?
   \[\text{Roc} = \frac{$50}{5 \text{ weeks}} = $10 \text{ per week}\]

12. A plane left Chicago at 8:00 A.M. At 1: P.M., the plane landed in Los Angeles, which is 1500 miles away. What was the average speed of the plane for the trip?
   \[300 \text{ mph}\]

13. After 30 baseball games, A-Rod had 25 hits. If after 100 games he had 80 hits, what is his average hits per baseball game?
   11 hits per 14 games

Find the slope of a line that has these points

14. \((8,2) \text{ and } (11,3)\) \[\frac{1}{3}\]

15. \((8,0) \text{ and } (8, 6)\) undefined