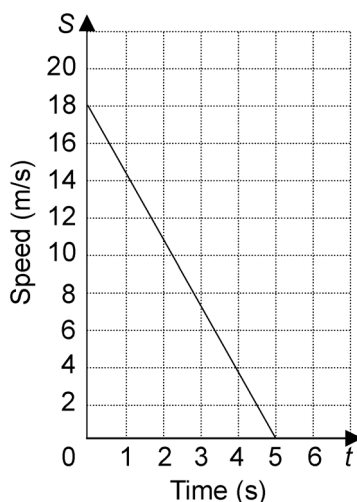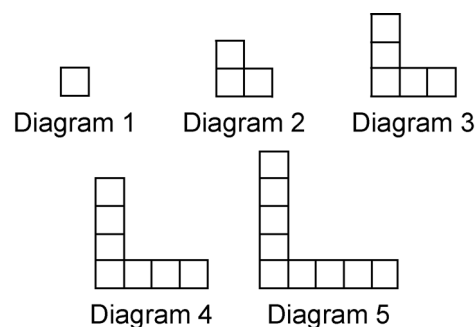# Practice: Slope as a Rate of Change

1. At rest, Vicky takes 62 breaths every 5 min. What is Vicky's rate of change of number of breaths?

2. When he is sleeping, Jeffrey's heart beats 768 times in 12 min. What is his rate of change of number of heartbeats?

3. A racecar driver completed a 500-km closed course in 2.8 h. What is the rate of change, or speed?

4. The graph shows the speed of the cars on a roller coaster once the brakes are applied.

a) Find the slope of the graph.
b) Interpret the slope as a rate of change.

5. a) Make a table relating the number of squares to the diagram number. Graph the data in the table.

Diagram 1   Diagram 2   Diagram 3

Diagram 4   Diagram 5

b) Find the slope of the graph.
c) Interpret the slope as a rate of change.

Other Word Problems

1. An airplane 20,000 feet above the ground begins descending at the rate of 1800 feet per minute. Assume the plane continues at the same rate of descent. The plane's height above the ground and minutes are related.

a. Write an equation to model the situation. Define your variables.
b. When will the plane reach 1000 feet?

2. Natalie is draining water out of her pool. After 3h, she has 495L left. After 7h, she has 355L left.

a. Write an equation relating the volume of water and time. Define your variables.
b. When will the pool be empty?

Practice: Connecting Variation, Slope, and First Differences

1. Look at this graph of a relation.
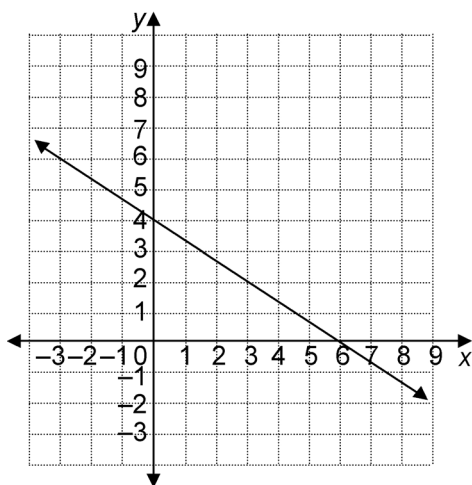
a) Calculate the slope.
b) Determine the vertical intercept.
c) Write an equation for the relation of the form $y = mx + b$.

2. Look at this graph of a relation.
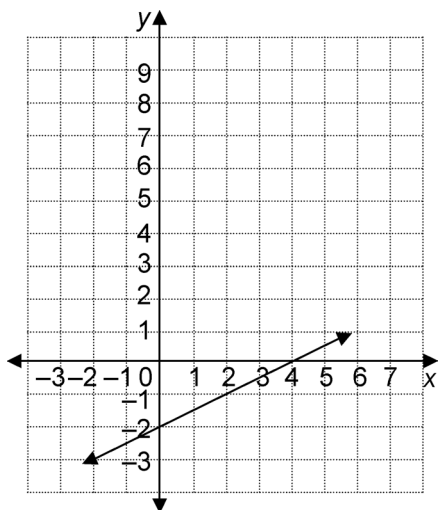
a) Calculate the slope.
b) Determine the vertical intercept.
c) Write an equation for the relation.

3. A relation is represented by the equation $y = 3x - 5$.
a) Is this relation a direct variation or a partial variation?

b) Identify the initial value of y.
c) Identify the constant of variation.
d) Make a table of values for x-values from 0 to 4.
e) Graph the relation.

4. The table represents a relation.

x	y
0	−1
1	3
2	7
3	11
4	15
5	19

a) Use a graph to represent the relation.
b) Use words to represent the relation.
c) Identify the vertical intercept and the slope. Write an equation to represent the relation.

5. A large cheese pizza costs $8.00, plus $0.50 for each topping.

a) Make a table to represent the relation.
b) Graph the relation.
c) Write an equation to represent the relation.

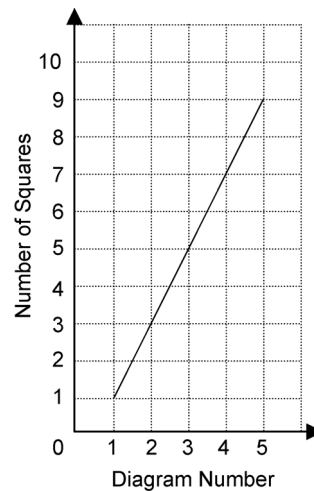**6.** Represent this relation using words, with numbers, and with an equation.
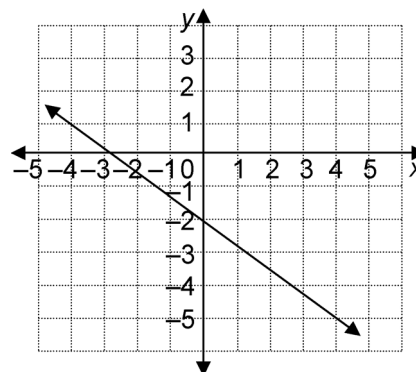
Solutions for "Slope as a Rate of Change" Day 2

BLM 5.4.1 Practice: Slope as a Rate of Change

1. 12.4 breaths/min
2. 64 beats/min
3. 179 km/h
4. **a)** −3.6
   b) Once the brakes are applied, the speed of the cars decreases at a rate of 3.6 m/s.
5. **a)**

Diagram Number	Number of Squares
1	1
2	3
3	5
4	7
5	9

   b) 2
   c) Each diagram has two more squares than the previous diagram.

Solutions for "Other Word Problems"

1a) Let x be number of minutes. Let y be height. y = −1800x + 20000
b) x = 10.56 minutes

2a. Let x be time (hours). Let y be volume (litres). y = −35x + 600
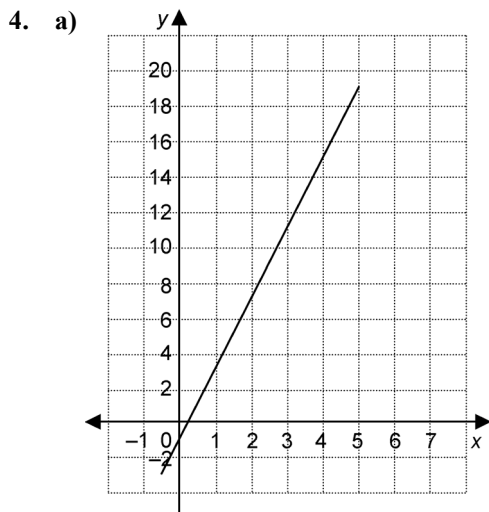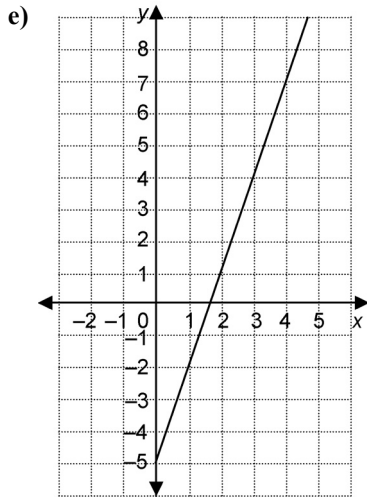b. x = 17.14 hours

BLM 5.6.1 Practice: Connecting Variation, Slope, and First Differences

1. **a)** $-\dfrac{2}{3}$ **b)** 4   **c)** $y = -\dfrac{2}{3}x + 4$

2. **a)** $\dfrac{1}{2}$ **b)** -2 **c)** $y = \dfrac{1}{2}x - 2$

3. **a)** partial variation
   b) -5
   c) 3
   d)

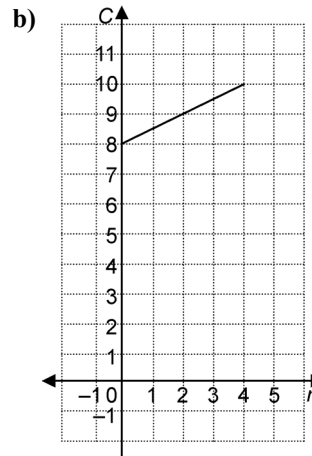| x	y
0	-5
1	-2
2	1
3	4
4	7

   e)

4. **a)**

   b) The relationship between x and y is a partial variation. The initial value is -1 and the constant of variation is 4.
   c) -1; 4; $y = 4x - 1$

5. **a)**

Number of Toppings, n	Cost ($), C
0	8.00
1	8.50
2	9.00
3	9.50
4	10.00

   b)

   c) $C = 0.50n + 8.00$

6. y varies partially with x, the initial value is -2 and the constant of variation is $-\dfrac{3}{4}$

x	y
-4	1
0	-2
4	-5

   $y = -\dfrac{3}{4}x - 2$