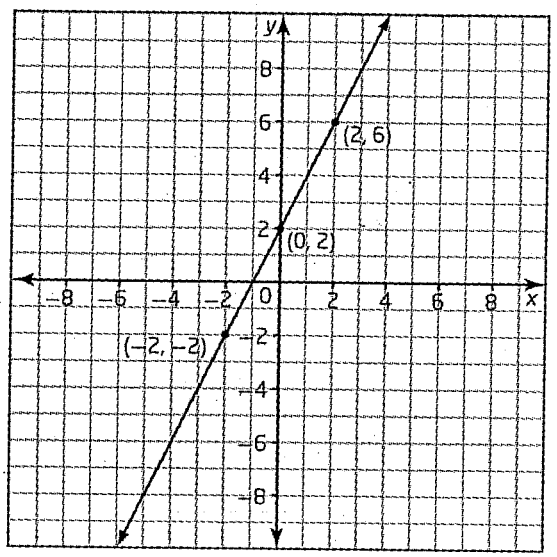
Day 5

5.6 Connecting Variation, Slope, and First Differences

Principles of Mathematics 9, pages 279–287

A

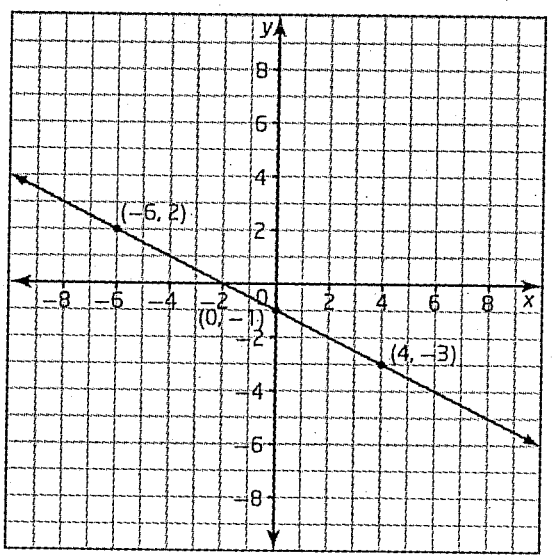
1. **a)** Determine the slope.



b) Determine the vertical intercept.

c) Write an equation for the relation.

2. **a)** Determine the slope.



b) Determine the vertical intercept.

c) Write an equation for the relation.

3. Make a table of values and graph each relation. Draw a right triangle on your graph to find the slope.

a) $y = 3x - 2$

b) $y = -2x + 1$

c) $y = \frac{1}{2}x$

d) $y = -0.5x - 1$

B

4. Use the rule of four to represent this relation in three other ways.

x	y
0	1
1	3
2	5
3	7
4	9

a) Use a graph.

b) Use words.

c) Use an equation.

5. Use the rule of four to represent this relation in three other ways.

x	y
0	3
1	1
2	−1
3	−3
4	−5

a) Use a graph.

b) Use words.

c) Use an equation.

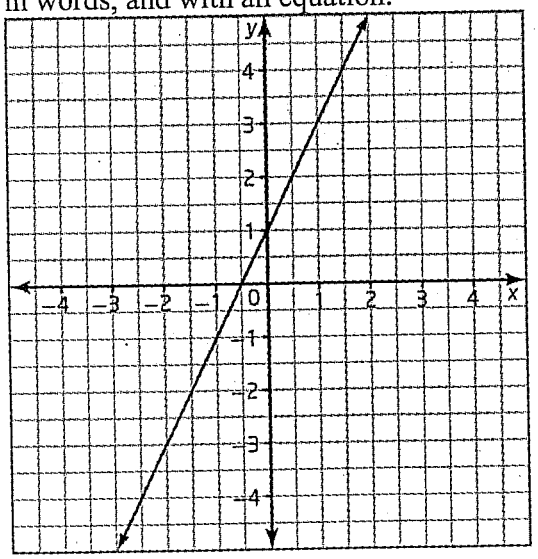
Day 5

6. A cleaning service charges $50 plus $10 per room to clean an apartment. Represent the relation using numbers, a graph, and an equation.

7. The cost of renting a bicycle is $20.00 plus $2.00/h.
   a) Graph this relation.
   b) Identify the slope and the vertical intercept of the line. What do they represent?
   c) Is this a direct or a partial variation? Explain.
   d) Write an equation relating the cost and the rental hours.

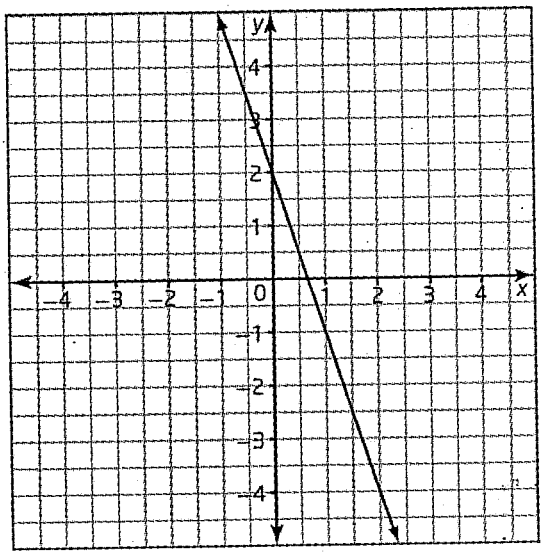
8. d varies directly with t. When $t = 5$, $d = 11$.
   a) Find the slope and the vertical intercept of the line.
   b) Write an equation for this relation.
   c) Graph this relation.

9. Complete the rule of four for this relation by representing it numerically, in words, and with an equation.



C

10. Complete the rule of four for this relation by representing it numerically, in words, and with an equation.



11. Complete the rule of four for the relation $y = 3x + 2$ by representing it numerically, graphically, and in words.

12. A water tank is being filled. The table shows the volume, in kilolitres, of water for the elapsed time, in minutes.

Time (min)	0	20	40	60	80
Volume of Water (kL)	20	50	80	110	140

   a) Confirm that this relation is linear.
   b) Graph this relation.
   c) Find the slope of the graph as both a fraction and a decimal. Is the slope constant? What does the slope represent?
   d) Write an equation for the volume of water in terms of the time.
   e) Use your graph or equation to find the volume of water after 30 min.

Solutions for "Connecting Variation, Slope, and First Differences"

Day 5

5.6 Connecting Variation, Slope, and First Differences, pages 93–94

1. a) 2 **b)** 2 **c)** $y = 2x + 2$

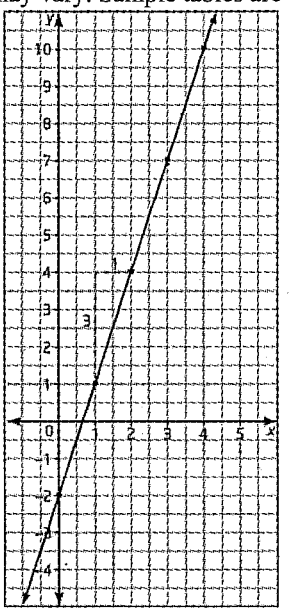
2. a) $-\frac{1}{2}$ **b)** -1 **c)** $y = -\frac{1}{2}x - 1$

3. Tables and graphs may vary. Sample tables are shown.

a)

x	y
0	–2
1	1
2	4
3	7
4	10

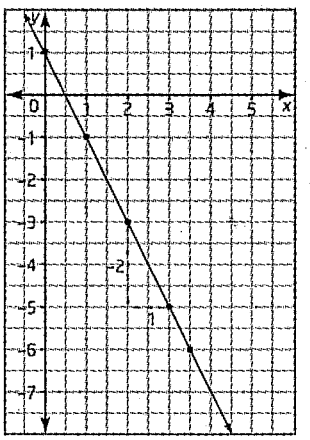
slope = 3



b)

x	y
0	1
1	–1
2	–3
3	–5
4	–7

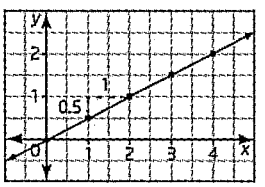
slope = –2



c)

x	y
0	0
1	0.5
2	1
3	1.5
4	2

slope = $\frac{1}{2}$

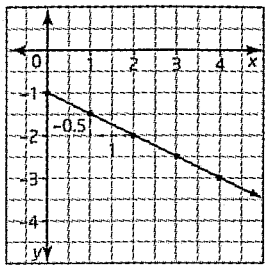


Solutions for "Connecting Variation, Slope, and First Differences"

Day 5

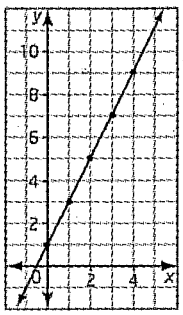
d)

x	y
0	−1
1	−1.5
2	−2
3	−2.5
4	−3



slope = −0.5

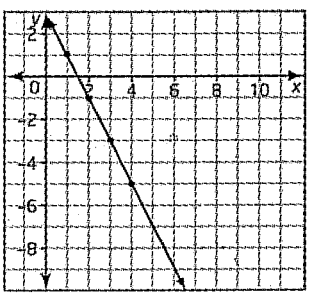
4. a)



b) Each time the value of x increases by 1, the value of y increases by 2. The graph is a straight line that does not pass through (0, 0). This is a partial variation.

c) $y = 2x + 1$

5. a)

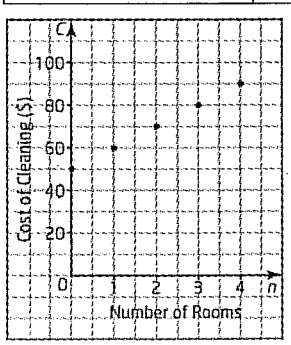


b) Each time the value of x increases by 1, the value of y decreases by 2. The graph is a straight line that does not pass through (0, 0). This is a partial variation.

c) $y = -2x + 3$

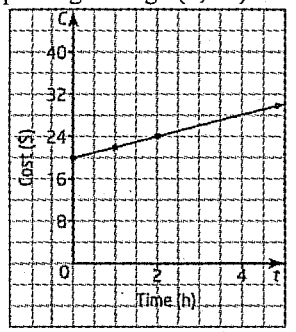
6.

Number of Rooms, n	Cost of Cleaning, C ($)
0	50
1	60
2	70
3	80
4	90



$C = 10n + 50$

7. a) The graph is a line starting at (0, 20) and passing through (1, 22) and (2, 24).



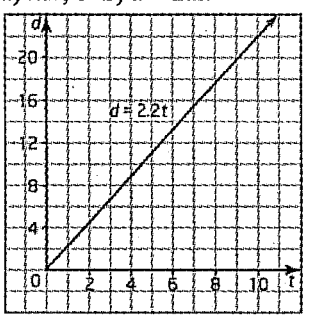
b) slope 2, cost of renting the bicycle for 1 h; vertical intercept 20, cost of renting the bicycle at the start of the rental

c) partial variation; graph is a straight line that does not pass through (0, 0)

d) $C = 2t + 20$

8. a) 2.2, 0 **b)** $d = 2.2t$

c)



9.

x	y
−2	−3
−1	−1
0	1
1	3

y varies partially with x. As the value of x increases by 1, the value of y increases by 2.

$y = 2x + 1$

10.

x	y
−1	5
0	2
1	−1
2	−4

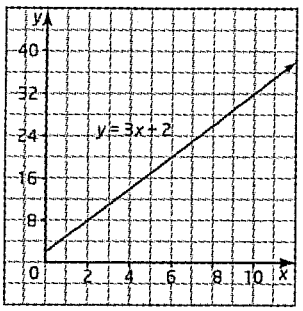
y varies partially with x. As the value of x increases by 1, the value of y decreases by 3. $y = -3x + 2$

Solutions for "Connecting Variation, Slope, and First Differences"

Day 5

11. Tables and graphs may vary. A sample table is shown.

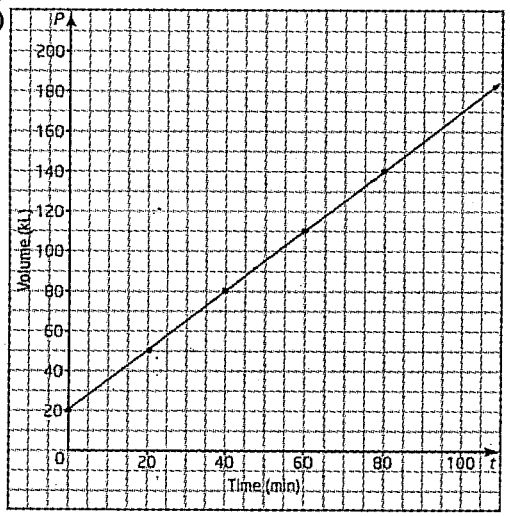
x	y
0	2
1	5
2	8
3	11
4	14



y varies partially with x. As the value of x increases by 1, the value of y increases by 3.

12. a) The relation is linear. As the value of t increases by 20 min, the volume of water increases by 30 kL.

b)



c) $\frac{3}{2}$, 1.5; constant; it represents that 1.5 kL of water fills the water tank every minute.

d) $V = 1.5t + 20$ **e)** 65 kL