

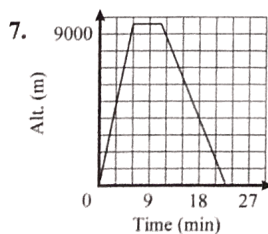
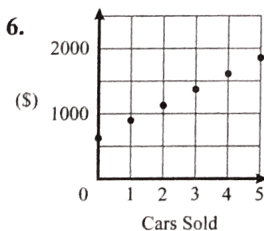
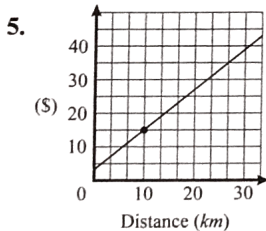
Linear Functions - Solutions

4.1 Slope

- a) x b) y c) m d) $m = \frac{y_2 - y_1}{x_2 - x_1}$ e) undefined f) 0 g) positive h) negative i) slope
- a) iv b) ii c) iii d) i e) v
- a) positive b) zero c) undefined d) negative
- a) -3 b) $\frac{3}{10}$ c) $\frac{3}{2}$ d) 5 e) $-\frac{2}{9}$ f) $-\frac{1}{2}$ g) 0 h) undefined
- a) $\frac{3}{2}$ b) 2 c) $-\frac{4}{5}$ d) undefined e) 0 f) $-\frac{5}{6}$ g) $\frac{7}{9}$ h) 0 i) undefined j) 2 k) $\frac{4}{5}$ l) $-\frac{25}{12}$
m) $-\frac{16}{25}$ n) $-\frac{9}{4}$
- a) $\frac{1}{2}, -\frac{2}{3}, \frac{3}{4}, -1$ b) $\frac{4}{5}, \frac{5}{6}, -1, -\frac{5}{4}$ c) $\frac{1}{2}, -\frac{2}{3}, \frac{3}{2}, -2$ d) $0, \frac{4}{3}, -\frac{3}{2}$, undefined
- -4 is steeper since 4 units down per 1 across is steeper than 3 units up per 1 across.
- Both answers are correct. As long as you start from the same point for both x and y , the answer is correct.
- The horizontal and vertical slopes or two of the sides are perpendicular to each other.
- All three have a slope of $\frac{5}{2}$, therefore they are all on the same line.
- b) i) -8000 ii) -5000 iii) -4000 iv) -3000
- Dividing by $(x - y)$ is dividing by zero. Dividing by zero is undefined.

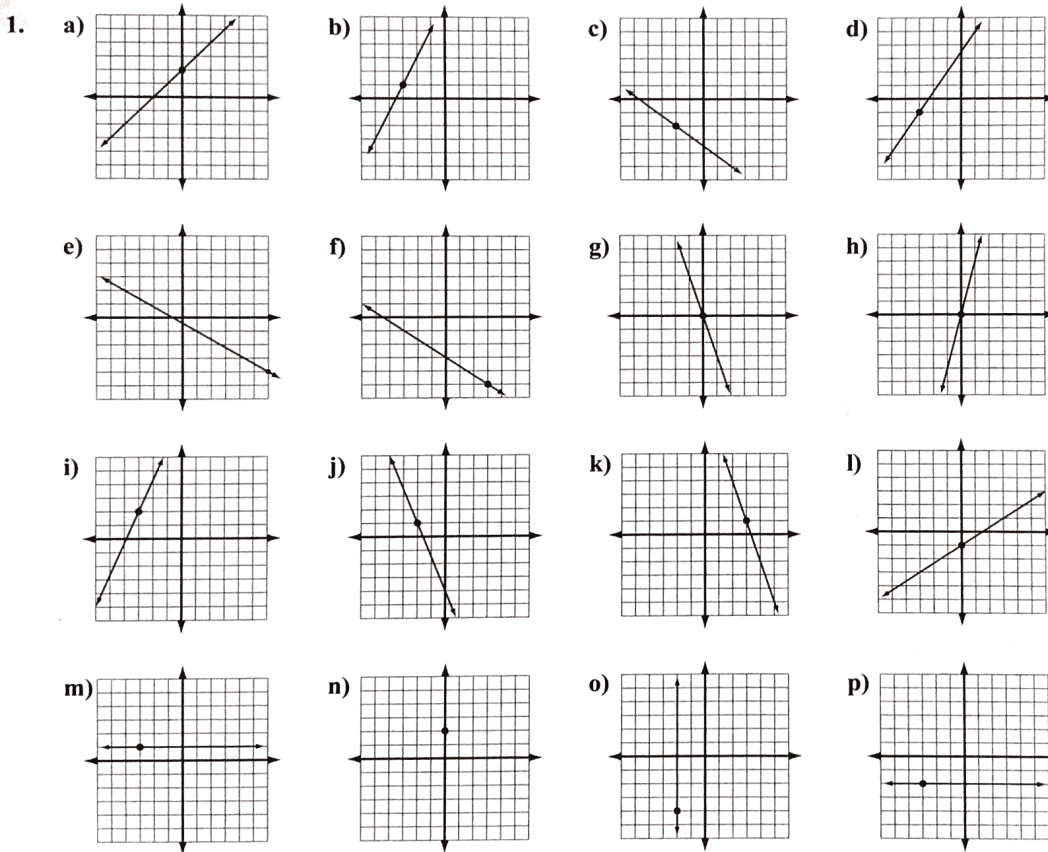
4.2 Rate of Change

- a) positive b) negative c) negative d) positive e) negative f) positive g) zero h) undefined
- a) positive b) negative c) negative d) negative e) positive f) negative g) zero h) positive i) negative j) zero
- a) iv b) v c) i d) iii e) vi f) ii
- a) 30 pages/hr b) 75 km/hr c) \$0.50/km d) $-\$333.33/\text{yr}$ e) -1.5°C/hr f) \$0/year g) $\frac{3}{4}$ cm/week
h) $-\frac{5}{6}$ beats per minute/year



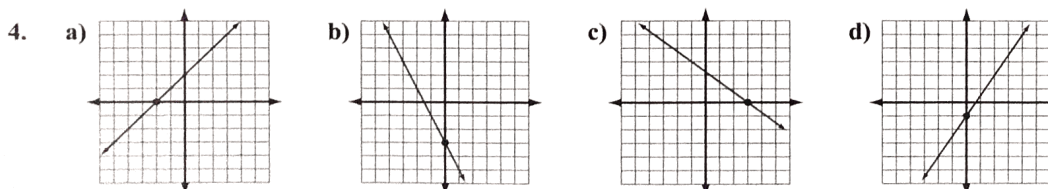
8. 33 minutes
9. 18 km/h
10. 500 ft/min
11. $\frac{5}{96}$ of all windows/hr
12. 0.1005
13. 100 m
14. 6 ft
15. a) -10 litres/sec b) 7600 litres c) 12 minutes 30 seconds d) 16 minutes 40 seconds
16. a) \$29.50 b) \$27.50
17. a) 12 km/h b) \$5.50/h c) \$0.4583/km
18. a) \$22.50/h b) 2 pages/h c) \$11.25/page
19. a) 0.127 litres/km b) \$60/day c) 157.67 km/day d) 38¢/km

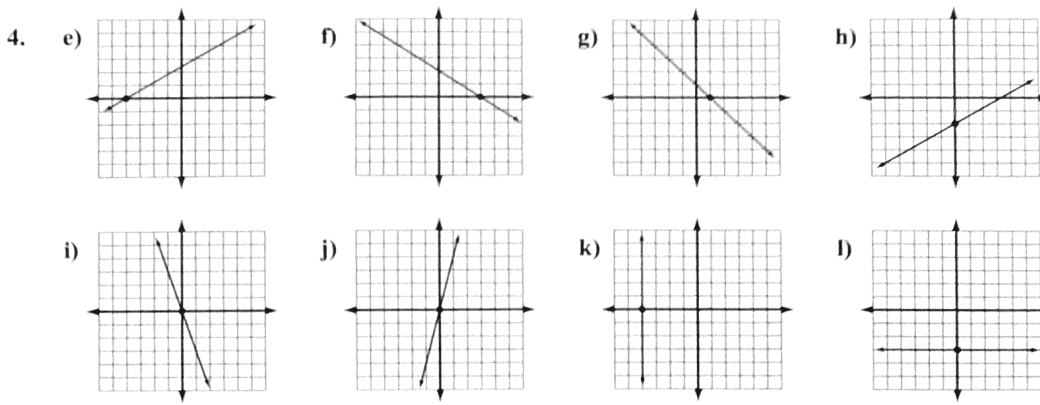
4.3 Graphing Linear Functions



2. a) $m = 1$, $x\text{-int} = 0$, $y\text{-int} = 0$ b) $m = \frac{6}{5}$, $x\text{-int} = -3\frac{1}{3}$, $y\text{-int} = 4$ c) $m = -\frac{1}{3}$, $x\text{-int} = -2$, $y\text{-int} = -\frac{2}{3}$
 d) $m = -4$, $x\text{-int} = -\frac{3}{4}$, $y\text{-int} = -3$ e) $m = -2$, $x\text{-int} = \frac{1}{2}$, $y\text{-int} = 1$ f) $m = -\frac{3}{5}$, $x\text{-int} = -3\frac{1}{3}$, $y\text{-int} = -2$
 g) $m = 0$, $y\text{-int} = 5$ h) $m = \text{undefined}$, $x\text{-int} = -1$

3. a) iv b) ii c) v d) vi e) iii f) i g) ix h) vii i) x j) viii





4. e) $(-2, 0), (0, 2)$ f) $(-2.5, 0), (0, 5)$ g) $(0, 0)$ d) $(3, 0), (0, 2)$ e) $(-3, 0), (0, -1.5)$ f) $(4, 0), (0, -1.5)$
 g) $(2.2, 0), (0, 3.7)$ h) $(-1.4, 0), (0, 3.5)$ i) $(-2.4, 0), (0, -5.7)$ j) $(-0.1, 0), (0, 0.3)$ k) $(0, 1)$ l) $(-1, 0)$
 m) $(-2, 0)$ n) $(0, -2)$
5. a) -1 b) -1 c) 1 d) 1 e) undefined f) 0
6. 100%
7. $-\frac{6}{5}$ and 0
8. 0 and $\frac{4}{3}$
9. 13
10. $-\frac{9}{4}$
11. 1
12. -2
13. -3

4.4 Parallel and Perpendicular Lines

1. a) neither b) perpendicular c) parallel d) perpendicular e) neither f) parallel g) neither h) parallel i) parallel
 j) parallel k) perpendicular l) perpendicular

2.

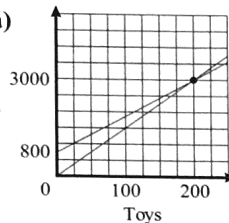
m_1	m_2	m_3
$\frac{2}{3}$	$\frac{2}{3}$	$-\frac{3}{2}$
$-\frac{3}{4}$	$-\frac{3}{4}$	$\frac{4}{3}$
$\frac{1}{4}$	$\frac{1}{4}$	-4
undefined	undefined	0
undefined	undefined	0
0	0	undefined
0	0	undefined
0	0	undefined
undefined	undefined	0

3. a) perpendicular b) parallel c) neither d) neither e) perpendicular f) neither g) parallel h) neither
 i) perpendicular j) perpendicular
4. -1
5. -9
6. $m_{AB} = \frac{1}{2}, m_{BC} = -2$, so $AB \perp BC$
7. $AB \parallel CD, BC \parallel DA$
8. $m_{AB} = m_{CD} = \frac{1}{4}, m_{BC} = m_{DA} = -4$, so $AB \parallel CD$ and $AB \perp BC$

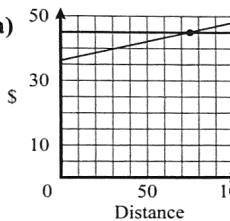
9. $m_{BC} = m_{AD} = -3$, $BC \parallel AD$
 10. -6
 11. -6
 12. -12
 13. 4.5

4.5 Applications of Linear Relations

1. a) \$40/hr b) $C = 40H + F$ c) \$20 d) D: $\{0, 1, 2, 3 \dots\}$, R: $\{20, 60, 100 \dots\}$
 2. a) $-\$2340/\text{yr}$ b) $V = N - 2340Y$ c) \$36 960 d) D: $\{0, 1, 2, 3 \dots\}$, R: $\{36\,960, 34\,620, 32\,280 \dots\}$
 3. a) $L = -\frac{1}{4}F + 24$ b) 17 in c) 56 pounds
 4. a) \$172 000/yr b) \$344 000 c) D: $\{-3, -2, -1, 0, 1, 2, 3 \dots\}$, R: $\{344\,000, 516\,000, 688\,000, 860\,000, 1\,032\,000 \dots\}$
 5. a) \$1.20/km b) $T = 1.2k + 3.50$ c) 42 km d) D: $\{0, 1, 2, 3 \dots\}$, R: $\{3.50, 4.70, 5.90 \dots\}$

6. a)  b) 200

7. a) $P = 60 - \frac{1}{150}u$ b) 5250 units c) \$20.00/unit
 8. a) \$60/item b) \$1400 c) \$4600
 9. a) \$8.00/painting b) \$30 c) \$250 d) D: $\{0, 1, 2, 3 \dots\}$, R: $\{-30, -22, -14 \dots\}$

10. a)  b) over 75 km

11. a) 10 movies b) \$6.50
 12. a) \$55 b) 11 dresses

4.6 Chapter Review

1. a) $-\frac{4}{3}$ b) $\frac{1}{10}$ c) $-\frac{5}{7}$ d) -1 e) undefined f) 0
 2. a) $\frac{4}{3}$ b) -1
 3. a) \$857.14 increase per year b) 8.33 pounds lost per month
 4. a) 14 km/h b) \$12/hr c) 85.7¢/km
 5. a) \$30/hr b) \$150/hr c) \$120/hr
 6. a) $\frac{4}{3}$ b) $-\frac{5}{2}$ c) $\frac{1}{5}$ d) $-\frac{1}{3}$ e) 0 f) undefined
 7. 2
 8. -1
 9. -11
 10. -1
 11. $-\frac{8}{3}$
 12. 4
 13. a) \$2000/hr b) \$5000 c) D: $\{0, 1, 2, 3 \dots\}$, R: $\{5000, 7000, 9000 \dots\}$
 14. a) \$630/course b) \$120 c) D: $\{0, 1, 2, 3 \dots\}$, R: $\{120, 750, 1380, 2010 \dots\}$