

Unit 2 *Using Graphs to Solve Equations*

Text Answers

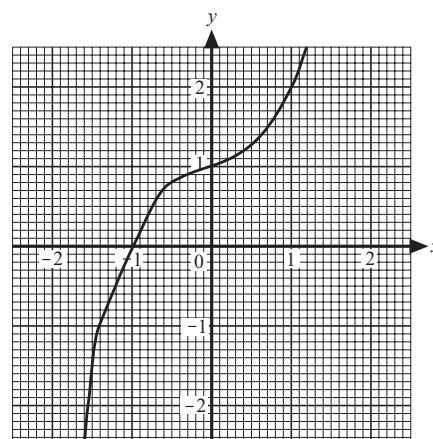
2.1 Solution of Simultaneous Equations by Graphs

- (3, 5)
 - (7, 1)
 - (0, -1)
 - (6, -2)
 - (-3, -7)
 - (-6, 0)
- (3, 2)
 - (-1, -2)
 - (1, 4)
- $y = 1 + 3x$, $y = 6 - 2x$
 - (1, 4)
- $2x + 4y = 40$
 - $y = 10 - \frac{1}{2}x$
 - $3x + 2y = 36$
 - $y = 18 - \frac{3}{2}x$
 - £8
 - £6
- $x + y = 28$, $2x + 5y = 80$
 - $y = 28 - x$, $y = 16 - \frac{2}{5}x$
 - 8
- $x = 2$, $y = 5$
- $y = x - 3$
 - | | | | |
|-----|---|---|----|
| x | 3 | 7 | 10 |
| y | 0 | 4 | 7 |
 - $x = \frac{17}{2}$, $y = \frac{11}{2}$
- | | | | |
|-----|-----|-----|-----|
| x | 100 | 200 | 300 |
| y | 15 | 18 | 21 |
 - (i) 400 (ii) \$24 (c) B, 400
- (ii) $x = 1.5$, $y = 3.1$
 - $x = \frac{20}{13}$, $y = \frac{40}{13}$
- $x \approx 1.9$, $y \approx 2.8$

2.2 Graphs of Common Functions

- reciprocal
 - quadratic
 - linear
 - cubic
 - quadratic
 - reciprocal
- cubic
 - reciprocal
 - linear
 - cubic
 - quadratic
 - reciprocal
- B
- B and C
- C
 - D
 - A
 - B
- D
 - A
 - B
 - C
- (i) $y = 1 - x^2$
 - $2y = 2 + x$
 - (iii) $y = x^2$
 - (iv) $xy = 1$

(b) Graph



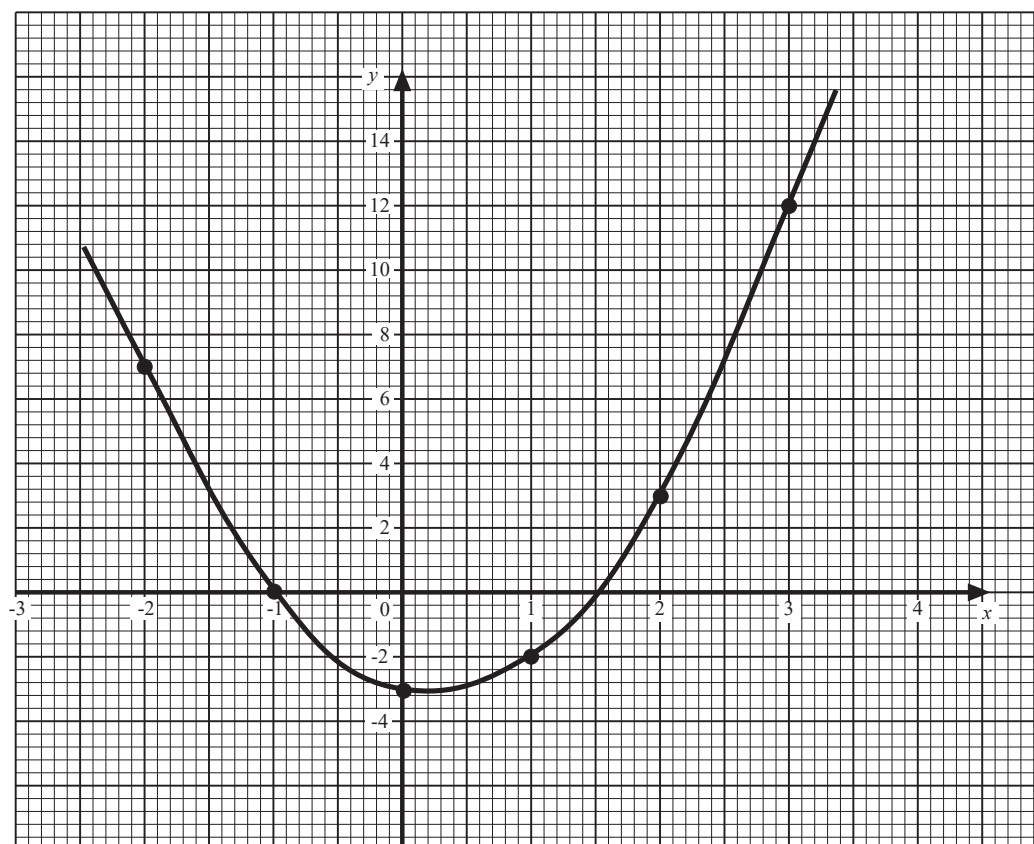
Unit 2 *Using Graphs to Solve Equations*

Text Answers

2.3 Graphical Solutions of Equations

1. 1.26 and 1.46
2. $x = 2$ or -1
3. $x = 3$ or -2 ; $x^2 - x - 6 = 0$
4. (a) $x = 0, -2, 1$ (b) no solutions (c) $x \approx \pm 1.5$ (d) $x \approx 2.2$
5. For example: plot the graphs of $y = x^3 - 8x + 5$ and $y = \frac{3}{x}$ and the points of intersection.
6. (a) $x = -3, 1$ (b) $x \approx 0.73, -2.73$ (c) $-0.3, -1.7$; $-1, a < -1$
7. About 1.3
8. (a) $x = -2, -1, 1$ (b) about $x = 1.5$ (c) $x = -2.25, -0.5, 0.8$
9. (a) At $x = 0, y = -3$
At $x = 1, y = -2$

(b)

(c) -1 and 1.5

Unit 2 *Using Graphs to Solve Equations*

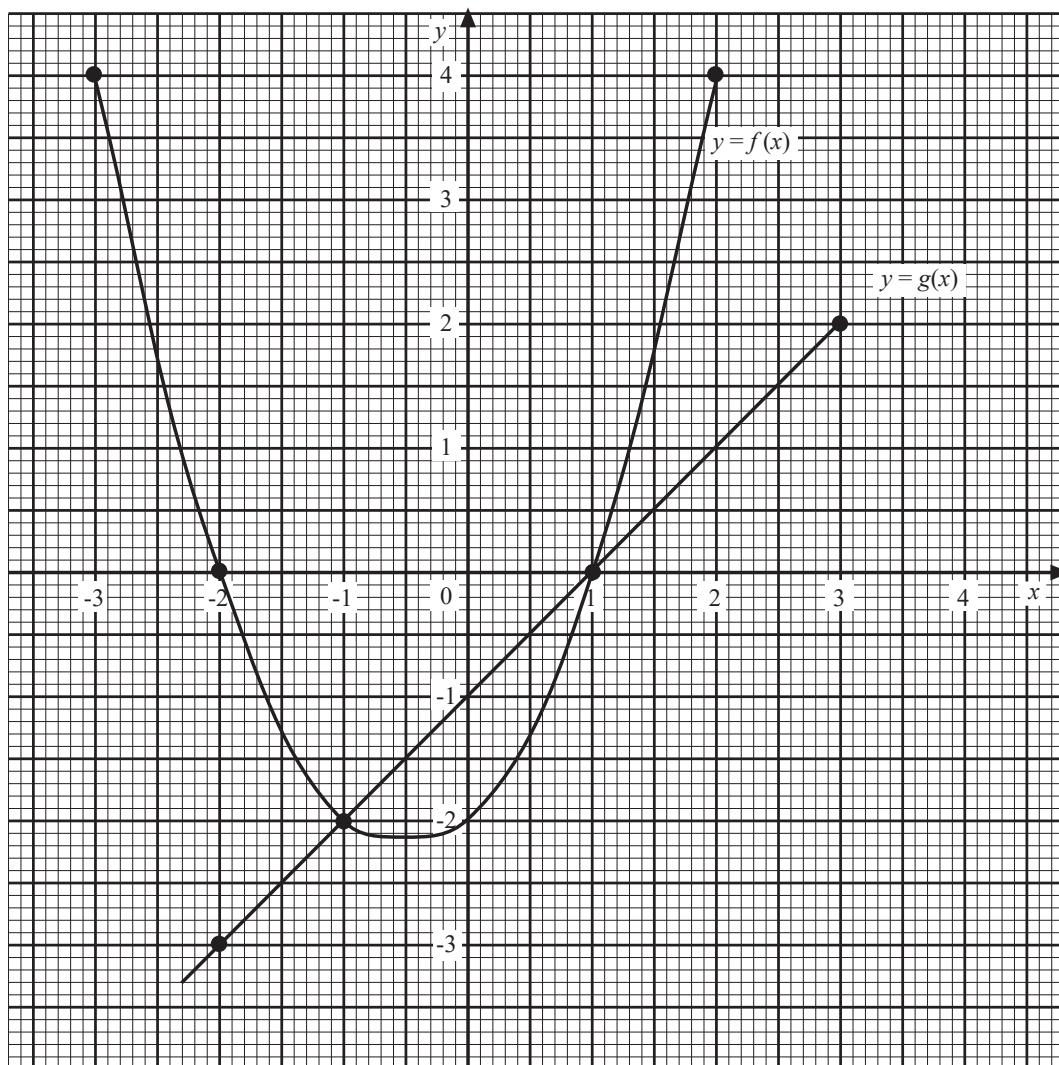
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2.3

10. (a) $p = 1$, $q = 1$, $r = -6$
 (b) They are both parabolic (quadratic) in shape.
 They are both symmetric.
 (c) $y = x^2$ is symmetric about $x = 0$
 $y = x^2 + x - 6$ is not symmetric about $x = 0$

11. (a) $f(-2) = 0$, $f(0) = -2$, $f(e) = 4$

(b)/(c)

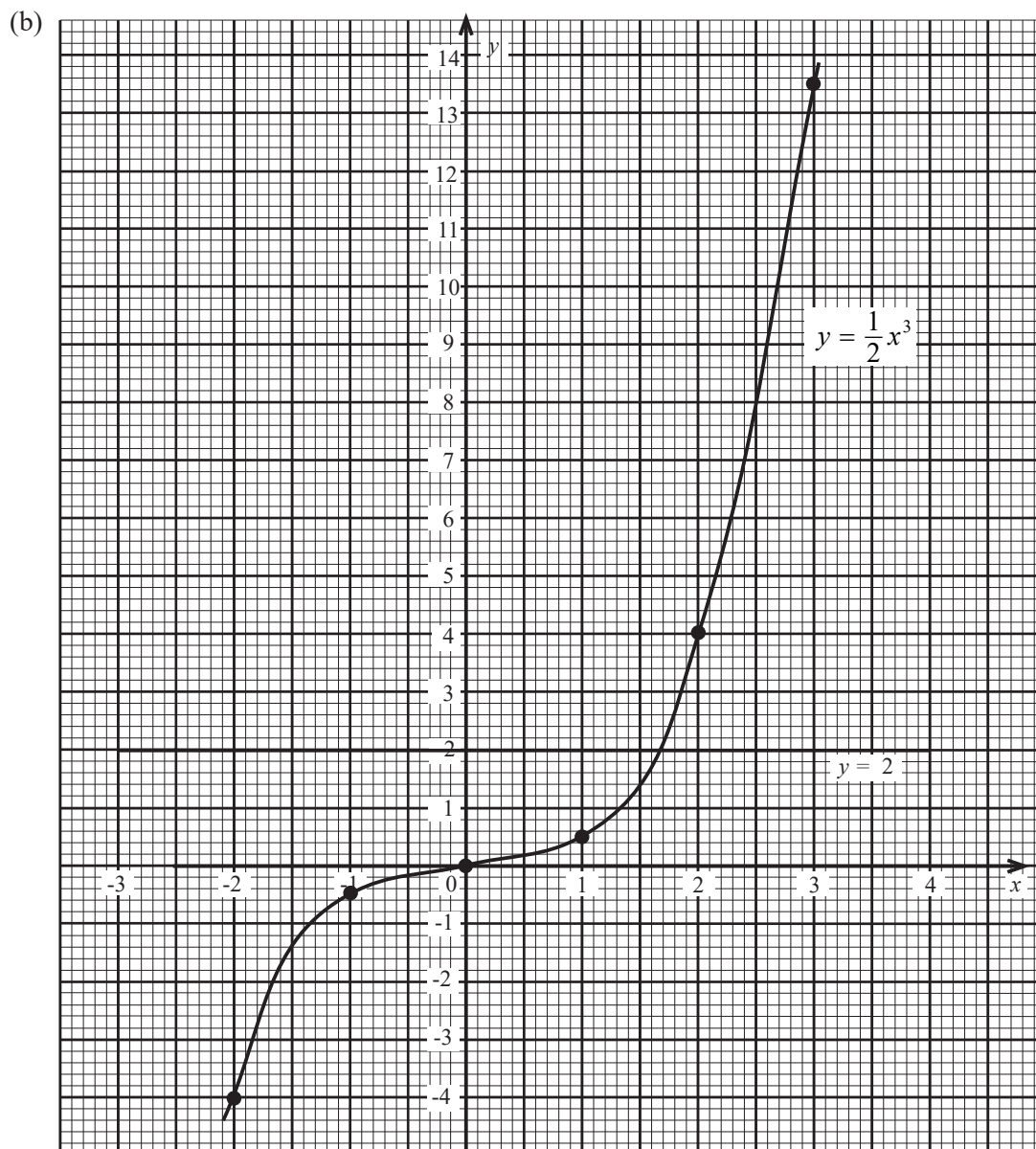


- (d) $(-1, -2)$ and $(1, 0)$
12. (a) $a = -2$, $b = 4$ (b) $x = -1$ or 3
- (c) (d) $-1 < x < 3$ (e) 2

Unit 2 *Using Graphs to Solve Equations*

Text Answers

2.3

13. (a) At $x = -2$, $y = -4$ At $x = 1$, $y = \frac{1}{2}$ (c) (i) $x = 2$ (ii) $x \leq 2$ (d) $4 = x^3$

2.4 Tangents to Curves

1. (b)

x	0	1	2	3	4
gradient	0	2	4	6	8

(c) gradient $= 2x$

2. (b) 5, -2 (c) 10

Unit 2 *Using Graphs to Solve Equations*

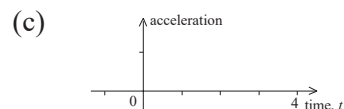
Text Answers

2.4

3. (a) $1.8\text{ }^{\circ}\text{C/min}$ (b) $0.5\text{ }^{\circ}\text{C/min}$ (c) $0.3\text{ }^{\circ}\text{C/min}$

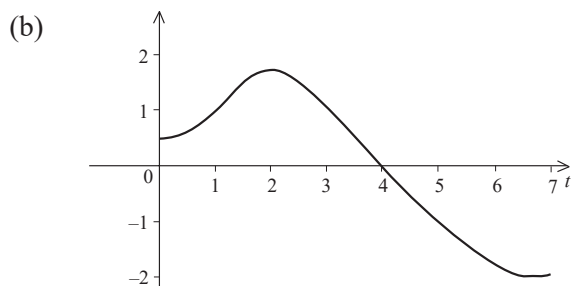
4. (b)

t	0	1	2	3	4	
$gradient$	-	8	-6	-4	-2	0



5. (a)

t	0	1	2	3	4	5	6	7
velocity	0.5	0.7	1.6	0.8	0	-1	-2	-2

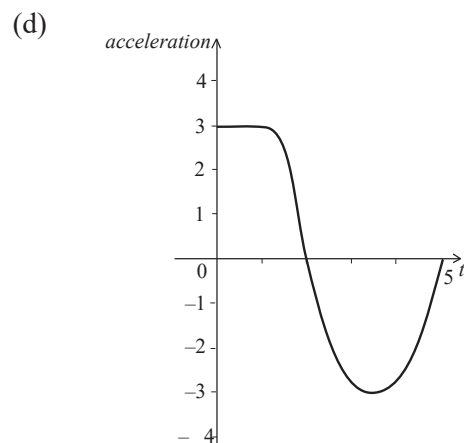
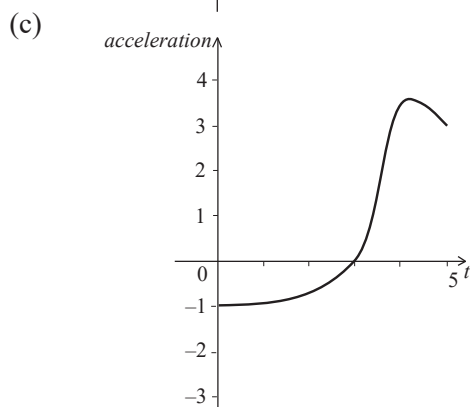
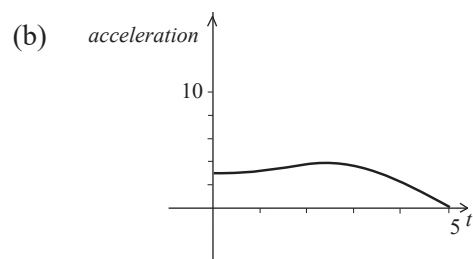
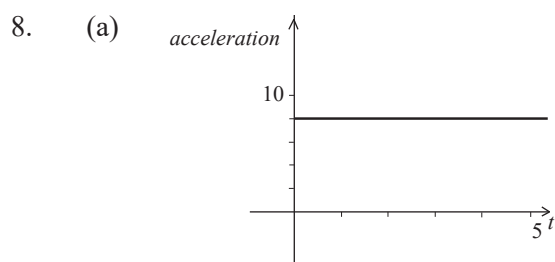
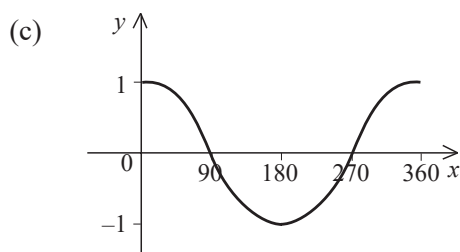


6. (a)

x	-3	-2	-1	0	1	2	3
gradient	27	12	3	0	3	12	27

(b) gradient $= 3x^2$

7. (a) $90^{\circ}, 270^{\circ}$ (b) 1 at $x = 0, 360^{\circ}$: -1 at $x = 180$



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2.4

9. 0.6 m/s^2

10. (b) (i) 50°C (ii) 2°C/s