

Student Text *UNIT 29 Using Graphs to Solve Equations*

Answers

29.1 Solution of Simultaneous Equations by Graphs

1. (a) (3, 5) (b) (7, 1) (c) (0, -1)
(d) (6, -2) (e) (-3, -7) (f) (-6, 0)
2. (d) (i) (3, 2) (ii) (-1, -2) (iii) (1, 4)
3. (a) $y = 1 + 3x$, $y = 6 - 2x$ (c) (1, 4)
4. (a) $2x + 4y = 40$ (b) $y = 10 - \frac{1}{2}x$ (c) $3x + 2y = 36$
(d) $y = 18 - \frac{3}{2}x$ (f) \$8 (g) \$6
5. (a) $x + y = 28$, $2x + 5y = 80$ (b) $y = 28 - x$, $y = 16 - \frac{2}{5}x$ (c) 8
6. $x = 2$, $y = 5$
7. (b) $y = x - 3$ (c)

x	3	7	10
y	0	4	7

 (d) $x = \frac{17}{2}$, $y = \frac{11}{2}$
8. (a) (i)

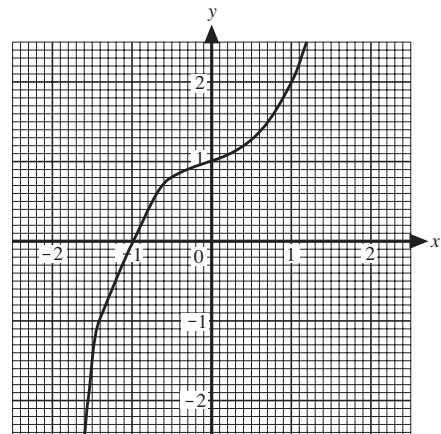
x	100	200	300
y	15	18	21

 (b) (i) 400 (ii) \$24 (c) B, 400
9. (a) (ii) $x = 1.5$, $y = 3.1$ (b) $x = \frac{20}{13}$, $y = \frac{40}{13}$
10. $x \approx 1.9$, $y \approx 2.8$

29.2 Graphs of Common Functions

1. (a) reciprocal (b) quadratic (c) linear
(d) cubic (e) quadratic (f) reciprocal
2. (a) cubic (b) reciprocal (c) linear
(d) cubic (e) quadratic (f) reciprocal
3. B
4. B and C
5. (a) C (b) D (c) A (d) B
6. (a) D (b) A (c) B (d) C
7. (a) (i) $y = 1 - x^2$ (ii) $2y = 2 + x$
(iii) $y = x^2$ (iv) $xy = 1$

(b) Graph



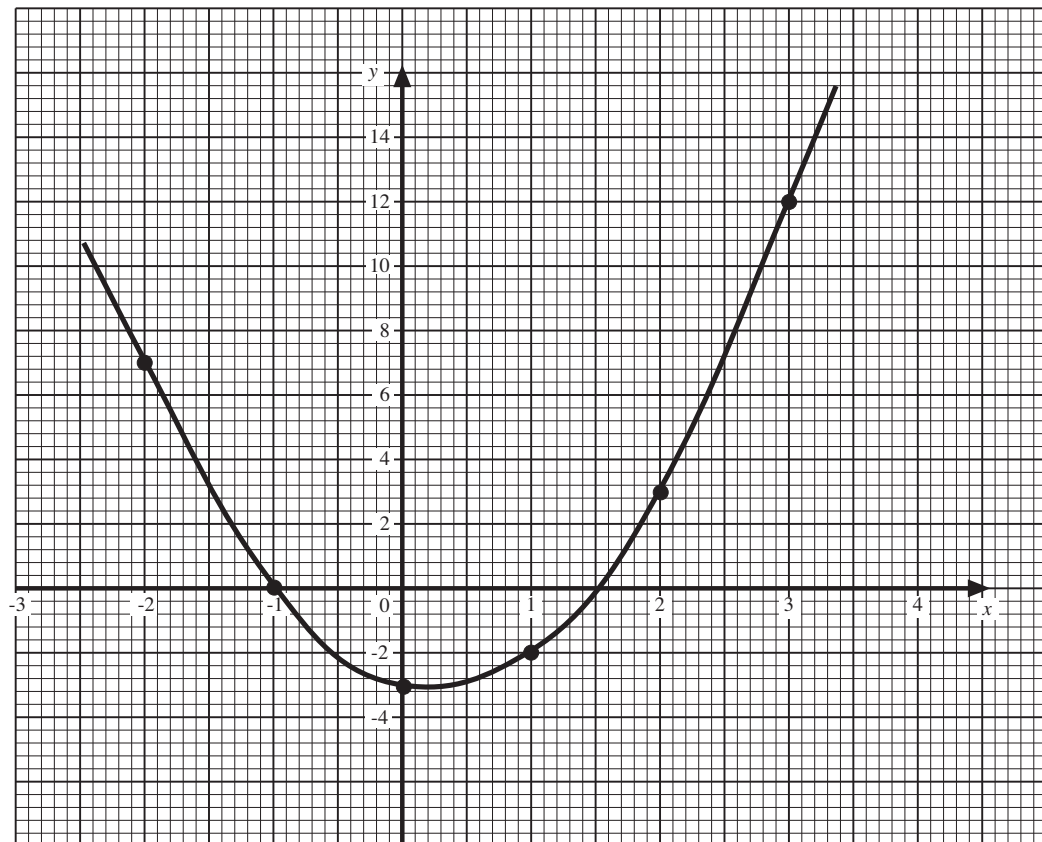
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29.3 Graphical Solutions of Equations

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

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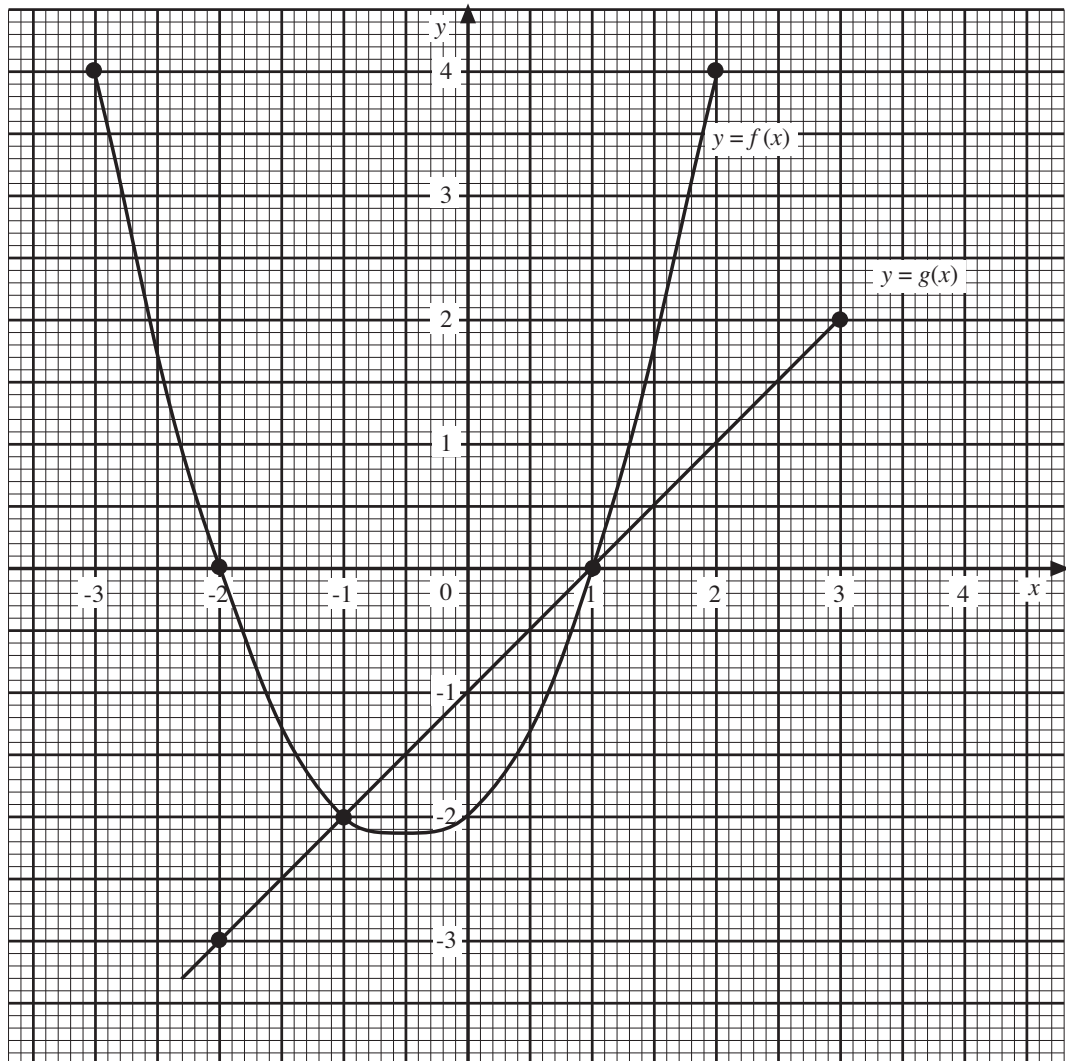
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10. (a) $p = 1$, $q = 1$, $r = -6$
 (b) They are both parabolic (quadratic) in shape.
 They are both symmetric.
 (c) $y = x^2$ is symmetric about $x = 0$
 $y = x^2 + x - 6$ is not symmetric about $x = 0$

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

(b)/(c)

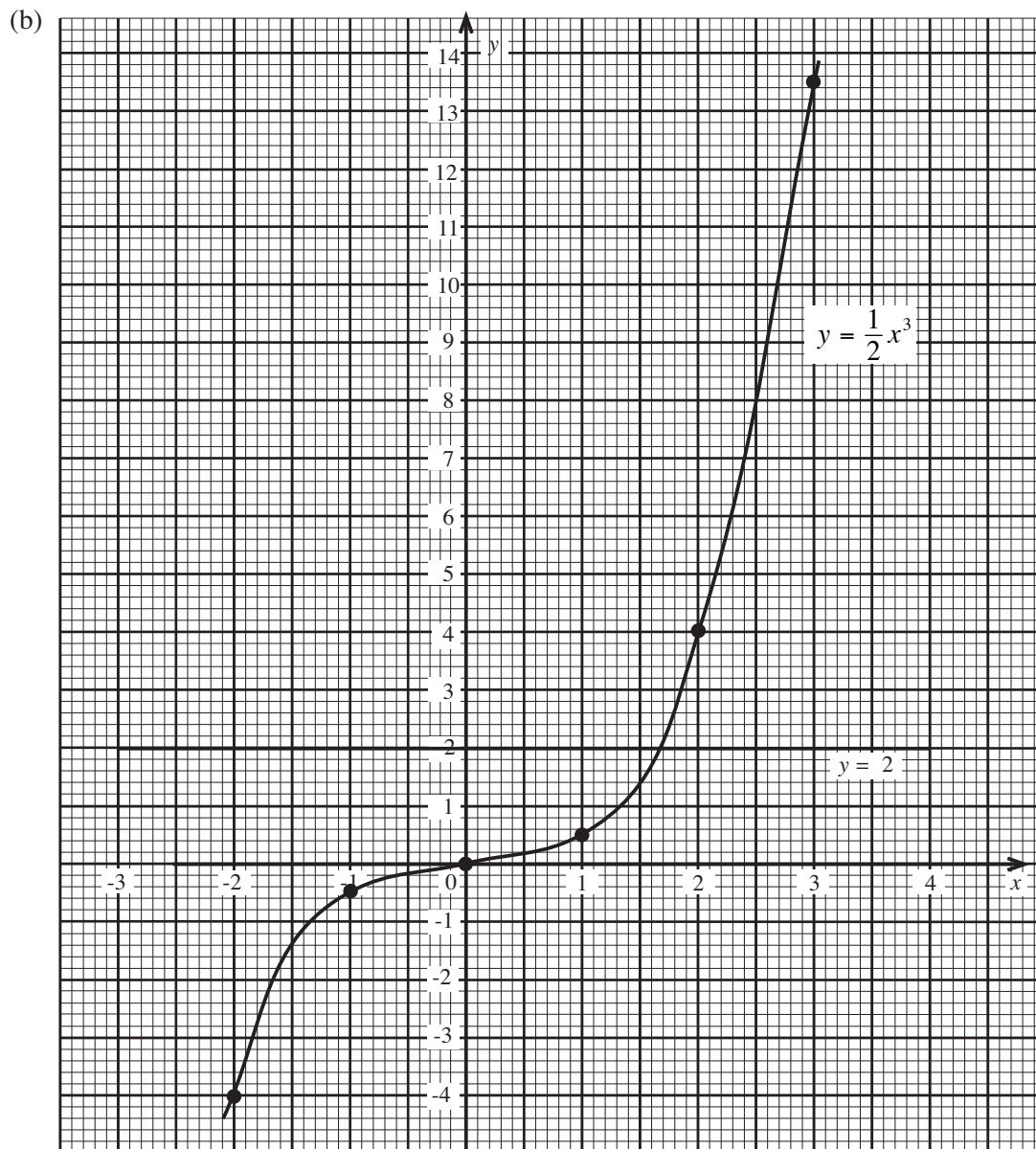


- (d) $(-1, -2)$ and $(1, 0)$
12. (a) $a = -2$, $b = 4$ (b) $x = -1$ or 3
- (c) (d) $-1 < x < 3$ (e) 2

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

29.4 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

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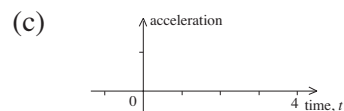
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3. (a) $1.8\text{ }^{\circ}\text{C/min}$ (b) $0.5\text{ }^{\circ}\text{C/min}$ (c) $0.3\text{ }^{\circ}\text{C/min}$

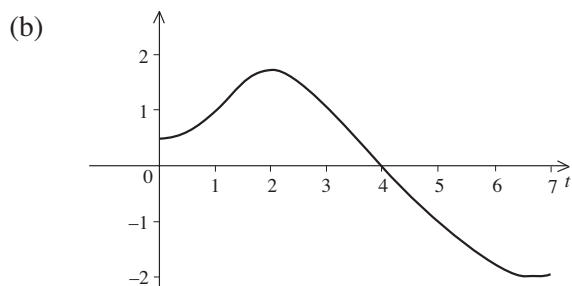
4. (b)

t	0	1	2	3	4				
<i>gradient</i>	-	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

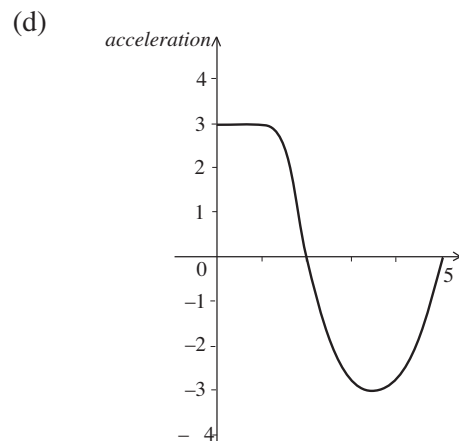
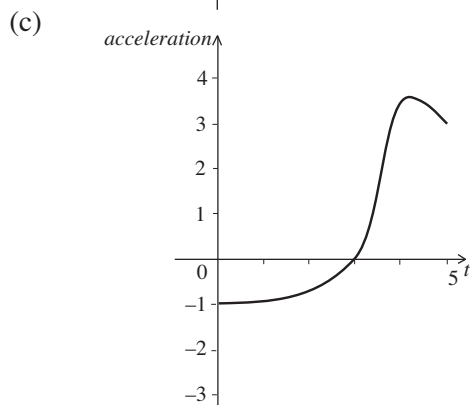
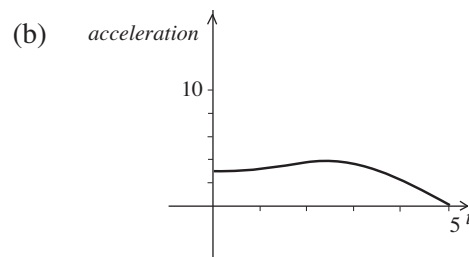
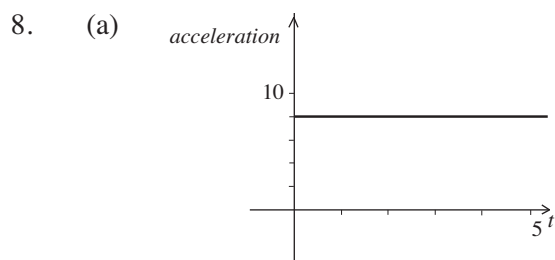
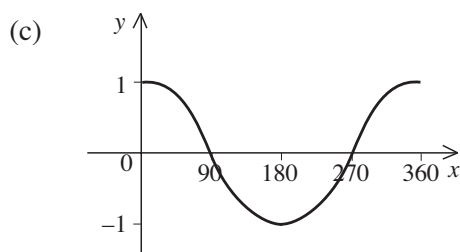


6. (a)

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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9. 0.6 m/s^2

10. (b) (i) 50°C (ii) 2°C/s