

Answers



Chapter 1

Exercise 1A

- | | |
|--|---------------------------|
| 1a Not a rate | b Rate |
| c Rate | d Not a rate |
| e Not a rate | f Rate |
| 2a \$25/h | b 12 m/s |
| c 70 L/h | d \$3.25/h |
| e 60 c/kg | f 10.5 km/L |
| g 300 rev/min | h 5°/h |
| i 11 m/s | j 70 L/h |
| 3a 5 km/L | b 150 cm/s |
| c \$128/m | d 112 L/min |
| e 6 mg/g | f 14 g/L |
| g 2.5 g/m ² | h 15 mL/min |
| i 20 c/call | j \$17.50/hour |
| 4a 6 goals/game | b 3 days/year |
| c \$0.30/kg | d \$30/h |
| e 4500 cans/h | f \$14 000/hectare |
| g 16 mm/day | h 1900 revs/min |
| i 0.25 km/min | j 4 min/km |
| 5a 654 m/s | b 200 cm/s |
| c 880 mm/h | d 920 m/min |
| e 400 m/s | f 0.0575 km/s |
| g 6090 mg/mL | |
| h 4 800 000 mL/kL | |
| i 30 000 cm/s | j 0.6 km/min |
| 6a 3 L/h | b 7 h |
| 7a 1.5 kebabs/person | |
| b \$6/person | |
| 8a 5.8 h/weekday | |
| b 6.5 h/weekend day | |
| c 42 h/week | |
| d 6 h/day | |
| 9 Sebastian: 3.75 min/km | |
| Alexander: 3.55 min/km | |
| 10 Growth per year is 1200 members. | |

Exercise 1B

- | | | |
|-------------------|-----------------|----------------|
| 1a \$12.50 | b \$196 | c \$175 |
| d \$195 | e \$2.90 | f 36 km |
| g 12 mL | h 20 mL | |

- 2** 90 runs
3 \$17.60
4 17.5 km
5 \$27
6 \$43.30
7 \$36.00
8 6 h
9 120 L
10 2.5 h
11 25 weeks
12 11 goals
13 1875 000 kb

Exercise 1C

- | | | |
|------------------------------|-------------------------|-------------------|
| 1a Option 1 | b Option 1 | |
| c Option 2 | d Option 2 | |
| e Option 2 | f Option 1 | |
| g Option 2 | h Option 2 | |
| i Option 1 | j Option 2 | |
| 2a Small \$1.25/100 g | | |
| Medium \$1.20/100 g | | |
| Large \$1.10/100 g | | |
| b Large cereal | | |
| 3a \$0.73 | b \$2.02 | c \$4.60 |
| d \$73 | e \$58 | |
| 4a \$1.25 | b \$2.15 | c \$3.95 |
| d \$4.85 | e \$109 | f \$171.50 |
| 5 6.25 kg | | |
| 6a \$175 | b \$233 | |
| 7a \$11/\$1000 | b \$10.80/\$1000 | |
| 8a \$1592.50 | b \$1683.50 | |
| c \$1820 | d \$1911 | |
| 9 9 h | | |
| 10a \$337.50 | b 32 h | c \$78 000 |
| 11a \$193.60 | b \$968 | |
| c \$1936 | d \$50 336 | |
| 12 \$1560 | | |
| 13 \$135.30 | | |

Exercise 1D

- | | |
|-------------------|------------------|
| 1a 80 km/h | b 97 km/h |
| c 80 km/h | d 88 km/h |
| e 96 km/h | f 54 km/h |

- | | | |
|-----------------------|----------------------|--------------|
| 2a 248 km | b 310 km | |
| c 161.2 km | d 77.5 km | |
| e 217 km | f 170.5 km | |
| 3a 3 h | b 3 h | c 3 h |
| d 5 h | e 6 h | f 8 h |
| 4a 7/300 h | b 227.27 km/h | |
| 5a 70 km | b 0.9 h | |
| c 77.78 km/h | | |
| 6a 45 min | b 64 km/h | |
| 7a 20 km | b 200 km | |
| c 300 km | d 95 km/h | |
| e 16.96 km/h | f 140 h | |
| 8 200 s | | |
| 9a 3 km | b 180 km | |
| 10a 17 m/s | b 72 m/s | |
| 11 36 km/h | | |
| 12 350 mm | | |
| 13a 233 km/h | b 267 km/h | |
| c 81 km/h | d 63 km/h | |
| e 48 km/h | f 115 km/h | |
| 14a 221 km | b 374 km | |
| c 34 km | d 2 km | |
| e 91 km | f 272 km | |
| 15a 5 h 29 min | b 50 min | |
| c 5 h 6 min | d 9 h 21 min | |
| e 20 min | f 1 h 40 min | |

Exercise 1E

- | | | |
|---------------------------|---------------------|--------------|
| 1a S | b P | c Q |
| d R | e T | |
| 2a 20 km | b 5 h | c 2 h |
| d 15 km | | |
| e Approximately 17 | | |
| f 2.5 km/h | | |
| 3a 1 h | b 140 km | |
| c 280 km | d 80 km/h | |
| e 140 km/h | | |
| 4a 1 h | b 150 km | |
| c 9 h | d 30 km/h | |
| e 37.5 km/h | f 33.33 km/h | |

- 5a** 200m **b** 80s
c i 30m
ii 62m
iii 150m

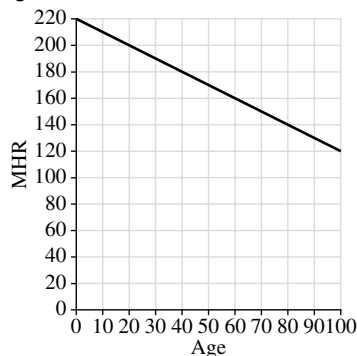
Exercise 1F

- 1a** 10L/100km **b** 20L/100km
c 5L/100km **d** 12.5L/100km
e 8.75L/100km **f** 6.15L/100km
g 5.8L/100km **h** 11.4L/100km
i 6.7L/100km **j** 3.8L/100km
2a 316L **b** 77L **c** 212L
d 51L **e** 57L **f** 24L
g 267L
3a 450km **b** 36L **c** \$43.20
4 480km
5a 27L **b** 4.5L **c** \$13.50
d \$27.00 **e** 74km **f** 370km
6a 562.5km **b** 134.4L **c** Once
7a 26.688L **b** \$18.28 **c** 34.848L
d \$23.87 **e** \$5.59
8a 1308L **b** \$1935.84
c 1680L **d** \$2688
e \$4623.84 **f** \$6153.60
9 Student investigation.

Exercise 1G

- 1a** 200 **b** 190 **c** 180
d 170 **e** 160 **f** 150
g 140 **h** 130 **i** 120

2a–c



- d** 195 **e** 182
f 65 **g** 45
3a 130–170 **b** 123.5–161.5
c 117–153 **d** 110.5–144.5
e 104–136 **f** 97.5–127.5
g 91–119 **h** 84.5–110.5
i 78–102

- 4a** 77–82 **b** 60–64

- c** Below average
d Athlete

5 Investigation

6 Investigation

- 7a** 91 **b** 55 **c** 1406
d 70.30 **e** 10.5 **f** 8.1

Exercise 1H

- 1a** less than 120
b 90–99
c 180 or higher
d 80–89
e Prehypertension
f Hypertension stage 1
g Hypertension crisis
h Hypertension stage 2

- 2a** $\frac{144}{88}$ **b** $\frac{135}{82.5}$

- 3a** 12.5% **b** 25%

- 4a** 171 **b** 115
c 132.15 **d** 14.08

- 5a** 182 **b** 105 **c** 167
d 130 **e** day 6 **f** 4

- g** 16
6a 344 700 **b** 2340 500

Review 1

Multiple-choice

- 1** A **2** A **3** C **4** D **5** C
6 A **7** A **8** C **9** C **10** B

Short-answer

- 1a** \$0.015/g **b** 240m/min
c 20mm/min **d** 4.8kg/mg
e 14 000 000 mL/kg
f 360c/mg
2 \$1015
3a \$18.40 **b** \$73.60
c \$5.52 **d** \$12.88
e \$920 **f** \$460
4a Option 1 **b** Option 1
c Option 2 **d** Option 2
5a 98km/h **b** 70km/h
c 192km/h **d** 96km/h

- 6a** 760km **b** 312km
c 247km **d** 646km

7 225s

8 64km/h

9 1h and 48min

- 10a** 15km **b** 3 hours
c i 6km **ii** 6km **iii** 15km
d 3.5 hours

11 640km

- 12a** 510km **b** 38.25L
c \$58.14

- 13a** 202 **b** 192
c 182 **d** 172

- 14a** 100 **b** 210
c 110 **d** 150.40

Chapter 2

Exercise 2A

- 1a** interconnected
b edges or arcs
c vertex
d degree
e arrows
2a True **b** False
c True **d** True
e False **f** False
g True
3a 5 **b** 6 **c** 2 **d** 3
e 3 **f** 1 **g** 3
4a 4 **b** 7 **c** 3
d 3 **e** 4 **f** 4
5a 2 **b** 3 **c** 2
d 3 **e** 10 **f** 5
6a 3 **b** 3 **c** 2
d 3 **e** 14 **f** 7
7a 2 **b** 3 **c** 3
d 2 **e** 10 **f** 5
8a 3 **b** 2 **c** 4 **d** 4
9a B **b** A, D & E
c A, B, D & E **d** C & F
10a A & B **b** C, D & E
c C, D & E **d** A & B
11a All vertices have a degree of 4.
b All vertices have a degree of 4.
c All 5 vertices have even degrees.
d There are no vertices with odd degrees.

12a 4 b 4 c 2 d 2
e 2 f 2 g 0 h 4

13a 4 b 6 c 4
d 2 e 0 f 4

14a 4 b 7 c 6 d 2

e There are two vertices with odd degrees (A & C).

f There are two vertices with even degrees (B & D).

15a 8 b 14 c 3
d 5 e 3 f 2

g All 8 vertices have a odd degree.

h There are no vertices with even degrees.

Exercise 2B

- 1a path b trail c path
d walk e trail f path
2a walk b cycle c path
d walk e path f walk
3a Cycle b Trail c Cycle
d Trail e Cycle
4a Trail b Circuit c Circuit
d Trail e Circuit f Trail

5a ii $G-K-L-S-E-K-M$

b i $K-E-G-M-L$

ii $E-K-L-M$

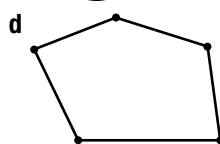
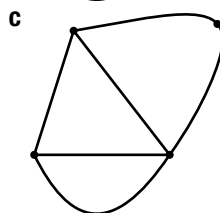
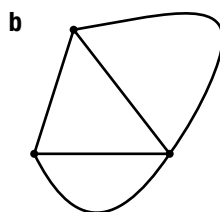
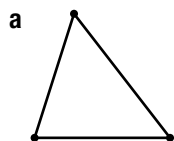
c ii $E-S-K-L-M-K-E$

d i $K-E-G-K$

iii $L-S-E-K-L$

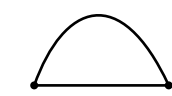
Exercise 2C

- 1a Graphs 1 and 3 are connected.
Graphs 2 and 4 are not connected.
b Graphs 2 and 3 are connected.
Graphs 1 and 4 are not connected.
2 There are many possible answers to this question. An example for each question is shown below.

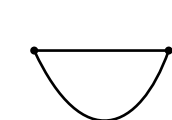


- 3 There are many possible answers to this question. An example for each question is shown below.

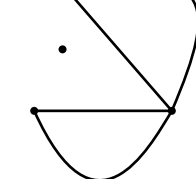
a



b



c



d



- 4a Graph 1 (Vertex C has degree 3 in graphs 2, 3 and 4 but degree 2 in graph 1. Graphs 2, 3, and 4 have the same edges.)

- b Graph 2 (Vertex C has degree 2 in graphs 1, 3 and 4 but degree 3 in graph 2. Graphs 1, 3, and 4 have the same edges.)

- 5a i 9 min ii 16 min
iii 10 min iv 11 min
v 11 min

b $A-F-E-C-D$

c $A-F-E-D$

6a 9 b 27 c 116 d 950

e 640 f 720 g 8620

h Perth–Sydney–Melbourne
Perth–Sydney–Adelaide–
Melbourne

Perth–Adelaide–Melbourne
Perth–Adelaide–Sydney–
Melbourne

i 1920

j Sydney–Adelaide–Melbourne
Sydney–Adelaide–Perth–
Melbourne
Sydney–Perth–Melbourne
Sydney–Perth–Adelaide–
Melbourne

k 7270

Exercise 2D

- 1a $\deg(A) = 3$, $\deg(B) = 4$,
 $\deg(C) = 2$, $\deg(D) = 4$,
 $\deg(E) = 3$

- b Eulerian trails exist if the graph is connected and has exactly two vertices with an odd degree. Vertices A and E are the only vertices with odd degrees.

c Example:

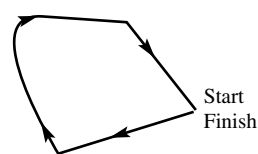
$A-B-E-D-B-C-D-A-E$

- 2a $\deg(A) = 2$, $\deg(B) = 2$,
 $\deg(C) = 4$, $\deg(D) = 2$,
 $\deg(E) = 2$

- b Eulerian circuits exist if the graph is connected and every vertex of the graph has an even degree. All vertices are even.

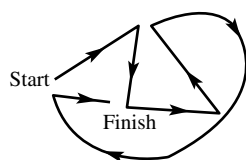
c Example: $A-B-C-E-D-C-A$

- 3a Eulerian circuit: all vertices are even

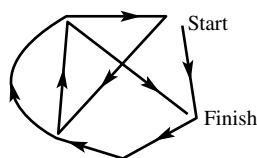


- b Neither: more than two odd vertices

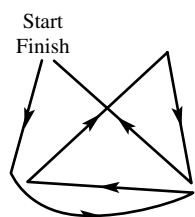
- c** Eulerian trail: two odd vertices, rest are even



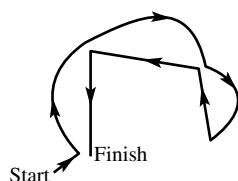
- d** Eulerian trail: two odd vertices, rest are even



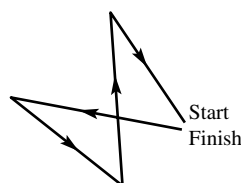
- e** Eulerian circuit: all vertices are even



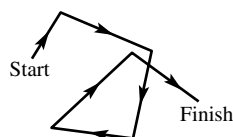
- f** Eulerian trail: two odd vertices, rest even



- g** Eulerian circuit: all vertices are even



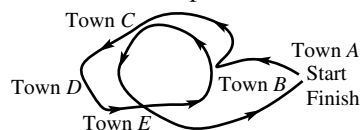
- h** Eulerian trail: two odd vertices, rest even



- i** Neither: more than two odd vertices

- 4a** Yes, all vertices are even.

- b** Other routes are possible.



- 5a** $A-B-D-C$

- b** Yes.

- c** No

- d** A Hamiltonian path passes through every vertex of a graph once and only once.

- e** $A-D-B-C$

- 6a** $A-C-F-E-D-B-A$

- b** Yes

- c** No

- d** A Hamiltonian cycle is a Hamiltonian path that starts and finishes at the same vertex.

- e** $A-F-E-D-C-B-A$

- 7** Other answers are possible.

- a** $A-B-C-D-E-F-A$

- b** $A-B-C-D-E-A$

- c** $A-B-C-F-I-H-E-G-D-A$

- d** $F-E-D-A-B-C-F$

- e** $A-E-F-D-C-B-A$

- f** $A-F-E-D-C-B-G-A$

- 8a** $C-D-E-B-A$. Hamiltonian path

- b** $E-A-B-C-D-E$. Hamiltonian cycle

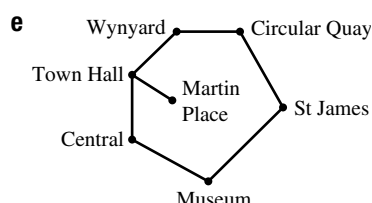
Exercise 2E

- 1a** Vertices are the train stations.

- b** Edges are the rail lines that connect the train stations.

- c** Yes. Every vertex in the graph is accessible from every other vertex.

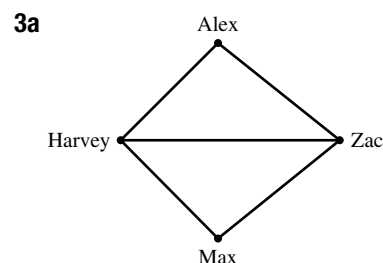
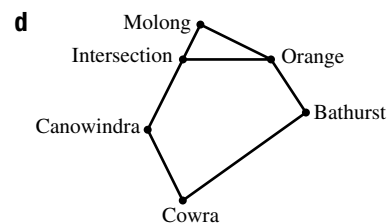
- d** City circle has seven stations – Central, Town Hall, Wynyard, Circular Quay, St James, Museum and Martin Place.



- 2a** Vertices are the regional towns and cities and other places where roads meet.

- b** Edges are the main roads linking the towns.

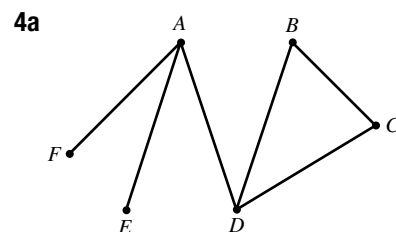
- c** Yes. Every vertex in the graph is accessible from every other vertex.



- b** Vertices are the names of the players.

- c** Edges indicate that a match has taken place between the two players.

- d** Alex and Max have not played a match against each other.

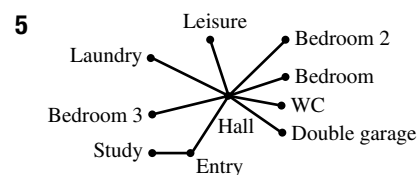


- b** Vertices are the cities A to F.

- c** Edges are the motorways M1 to M6.

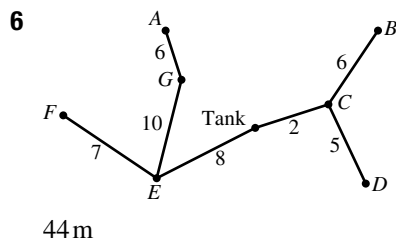
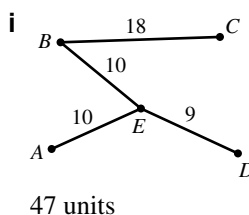
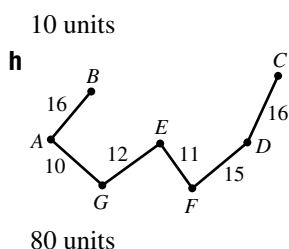
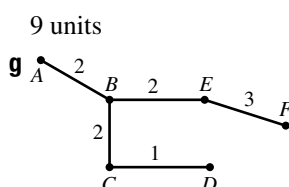
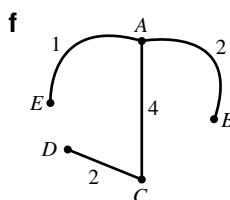
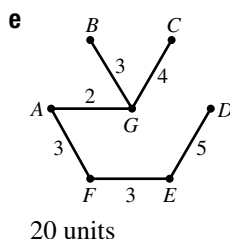
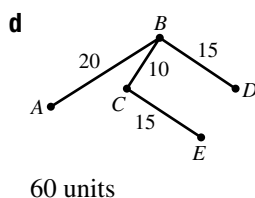
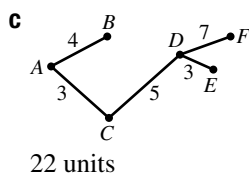
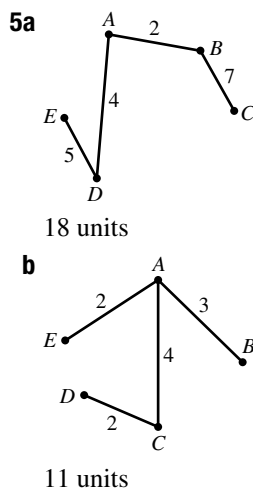
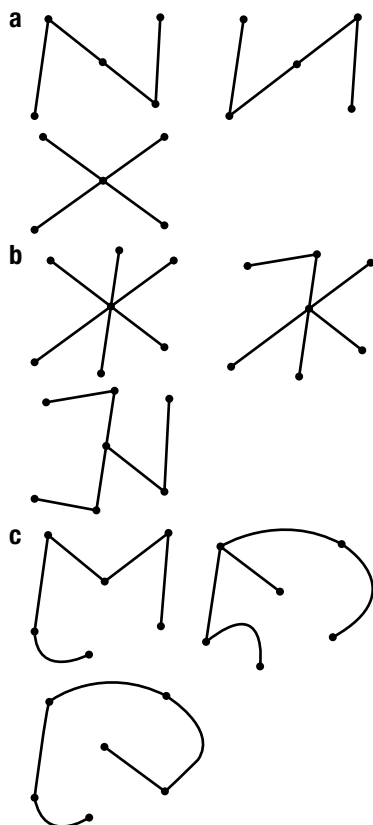
- d** B and C are not linked to A.

- e** Travel from F to A and then from A to D.

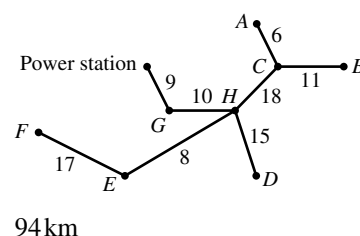


Exercise 2F

- 1a** Edges **b** Length
c Spanning **d** Eight
e Nine
- 2a** 14 **b** 6
c Various answers are possible.
d Various answers are possible.
- 3a** Tree **b** Tree
c Not a tree **d** Tree
e Not a tree
f Not a tree as it has a loop
- 4** Other answers are possible.



7



Exercise 2G

- 1a** 8h **b** 11h **c** 15h **d** 12h
2a 20m **b** 30m **c** 35m **d** 25m
3a \$8 **b** \$6 **c** \$10 **d** \$6
e \$9 **f** \$4 **g** \$6 **h** \$9
4a 5 min **b** 5 min
c 10 min **d** 7 min
e 8 min **f** 8 min
5a 17m **b** 19m **c** 19m
d 16m **e** 18m **f** 26m
6a 34km **b** 37km **c** 56km
d 64km **e** 22km **f** 28km
g A-E-F-G-I or A-C-F-G-I, 26km
h C-A-B-D, 17km
7a 64 min **b** 64 min
c 77 min
d A-B-C-E-F-D-A, 63 min
e The shortest average time may not be the best path for a competitor. For example, if a particular competitor is faster than average going uphill, then they could be quicker going through the checkpoints with hills.
8a 145 min **b** 220 min
c A-B-E-F-G 115 min
d The shortest time in a train journey may not be the best path if the train is crowded and you do not get a seat. The best path could be to catch a train that takes longer but you have a seat on the train.
e 135 minutes, using the route A-B-F-G.
9a Town B, 7 km
b Town D, 6 km
c Town C, 8 km
d Town E or F, 9 km
e Town E or F, 7 km
f 37 km

- 10a** Town C, \$8 million
b Town D, \$4 million
c Town B, \$5 million
d Town E, \$20 million
e Town F, \$8 million
f Town G, \$11 million
g \$56 million
- 11a** Town F, 90km
b Town E, 90km
c Town C, 100km
d Town H, 70km
e Town B, 80km
f Town D, 100km
g Town G, 200km
h 730km

Review 2

Multiple-choice

- 1** A **2** C **3** D **4** B and C
5 C **6** B **7** A **8** A

Short-answer

- 1a** 2 **b** 5 **c** 3
d 4 **e** 4 **f** 2

- 2a** $\deg(A) = 1$, $\deg(B) = 2$,
 $\deg(C) = 4$, $\deg(D) = 2$,
 $\deg(E) = 4$, $\deg(F) = 1$

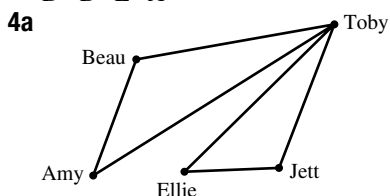
- b** Eulerian trails exist if the graph is connected and has exactly two vertices with an odd degree. Vertices A and F are the only vertices with odd degrees.

- c** A-C-B-D-E-C-E-F

- 3a** $\deg(A) = 2$, $\deg(B) = 4$,
 $\deg(C) = 2$, $\deg(D) = 4$,
 $\deg(E) = 4$, $\deg(F) = 2$

- b** Eulerian circuits exist if the graph is connected and every vertex has an even degree. All vertices are even.

- c** A-B-C-D-E-F
D-B-E-A



- b** Vertices are the names of the players.
c Amy & Ellie, Amy & Jett, Beau & Ellie, Beau & Jett

5 24

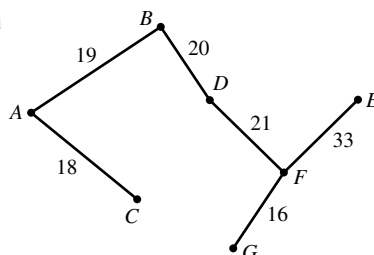
6 56

7a 11km

b 17km

8 12

9a



b 127km

Chapter 3

Exercise 3A

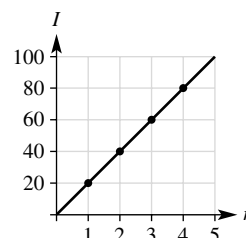
- 1a** \$5850 **b** \$910
c \$37000 **d** \$1134
e \$15225
- 2a** \$600 **b** \$1089
c \$5020 **d** \$10005
e \$11518.75
- 3a** 1.2% **b** 0.4%
c 2.4% **d** 3.6%
- 4a** \$8 **b** \$144
c \$1440 **d** \$900
- 5** \$55200
- 6** \$69.75
- 7a** \$22000 **b** \$122000
- 8** \$5040
- 9a** \$7680 **b** \$7560
c \$7200
- 10** Computer application
- 11** \$71.75
- 12** \$40000
- 13** 7.5%
- 14** $3\frac{1}{3}$ years
- 15a** \$51000 **b** \$2000

Exercise 3B

1a $I = 120n$

b	n	0	1	2	3	4
	I	0	20	40	60	80

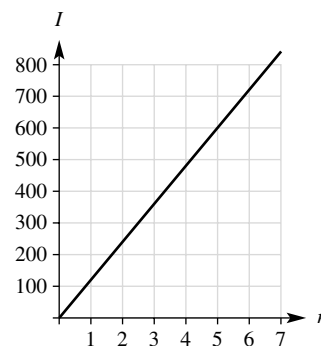
cd



2a $I = 120n$

b	n	0	1	2	3	4	5
	I	0	120	240	360	480	600

cd Simple interest on \$2000 at 6% p.a.

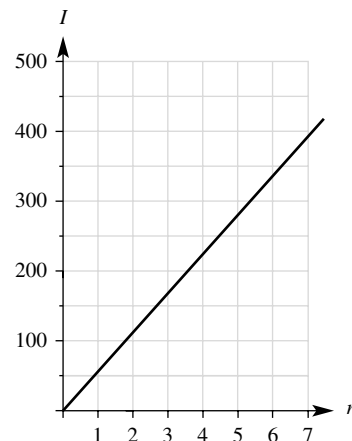


e \$300 **fg** \$720

3a $I = 56n$

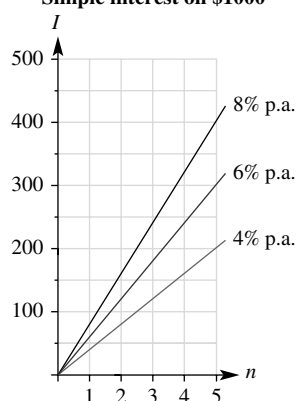
b	n	0	1	2	3	4	5	6
	I	0	56	112	168	224	280	336

cd Simple interest on \$800 at 7% p.a.



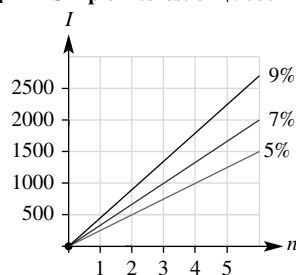
e \$140 **fg** \$390

4a Simple interest on \$1000



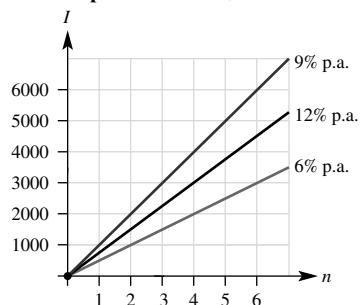
- b** i \$200 ii \$300 iii \$400
c i \$140 ii \$210 iii \$280
d i 5 years ii 3.3 years
 iii 2.5 years

5a Simple interest on \$5000



- b** 5% earns \$625, 7% earns \$875 and 9% earns \$1125
c 5% earns \$1250, 7% earns \$1750 and 9% earns \$2250
d 5% takes 4 years, 7% takes about 2.8 years and 9% takes 2.2 years

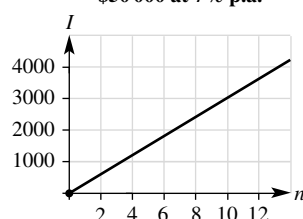
6a Simple interest on \$100 000



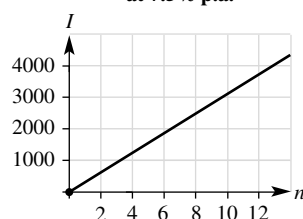
- b** 6% earns \$500, 9% earns \$750 and 12% earns \$1000

- c** 6% earns \$3000, 9% earns \$4500 and 12% earns \$6000
d 6% takes 4 months, 9% takes about 2.7 months and 12% takes 2 months

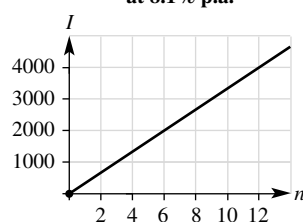
7a Simple interest on \$50 000 at 7% p.a.



b Simple interest on \$50 000 at 7.5% p.a.



c Simple interest on \$50 000 at 8.1% p.a.



Exercise 3C

- 1a** \$424.36 **b** \$35 372.71
c \$70710.87 **d** \$3920.88
e \$22843.06 **f** \$78311.44
g \$388 543.35 **h** \$16634.84
2 \$17640
3 \$101011.73
4a \$2800 **b** \$3591
c \$5600 **d** \$9263
5a \$10063.69 **b** \$102028.69
c \$1307.84 **d** \$23 509.61
6 \$18281.70
7 \$7378

- 8a** \$9289.92 **b** \$13 968.61
c \$44 799.23
9 Computer application
10 Investment 2 by \$80
11a \$828.51 **b** \$1586.23
c \$7147.51 **d** \$32 539.90
e \$1587.65 **f** \$10387.92
g \$1272.62 **h** \$1920.26
i \$583.20
12 Investment E
13 \$4588.29
14a \$25 531.63 **b** \$9131.63
15 \$12 107.45
16 \$2536.50
17 \$6433.75
18a \$20 766.90 **b** \$7266.90

Exercise 3D

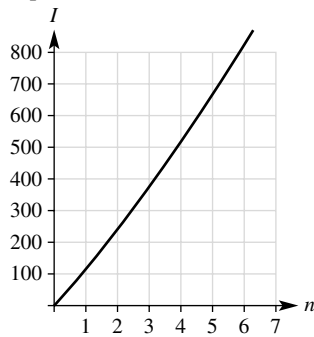
- 1a** \$29063.34
b \$48 444.86
c \$121 953.77
d \$112 227.23
e \$3243.49
f \$55 621.16
g \$189 862.19
h \$46 543.55
2 \$39 604.68
3 \$53 608.98
4 \$49 662.32
5 \$3542
6a \$925 **b** \$5964
c \$1304 **d** \$15 421
e \$2679
7 \$57 747.51
8 \$15917.61

Exercise 3E

- 1a** $FV = 2000 \times (1.06)^n$
b $I = 2000(1.06)^n - 2000$

c		0	1	2	3	4	5
n		0	1	2	3	4	5
FV	2000	2120	2247	2382	2525	2676	
I		0	120	247	382	525	676

de Compound interest on \$2000 at 6% p.a.



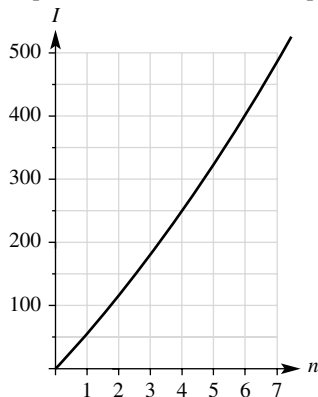
f \$840

2a $FV = 800 \times (1.07)^n$

b $I = 800(1.07)^n - 800$

c	n	0	1	2	3	4	5	6
	FV	800	856	916	980	1049	1122	1201
	I	0	56	116	180	249	322	401

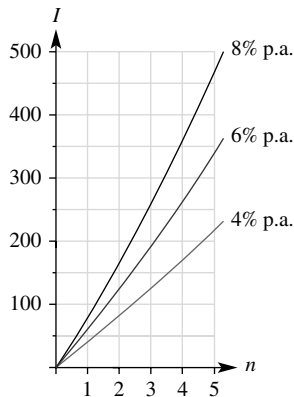
de Compound interest on \$800 at 7% p.a.



f \$150

g \$485

3a Compound interest on \$1000



b i \$217

ii \$338

iii \$469

c i \$150

ii \$220

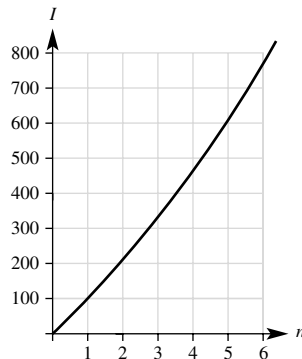
iii \$310

d i 4.6 years

ii 3.1 years

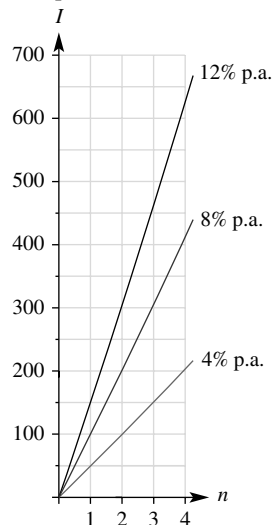
iii 2.3 years

4 Compound interest on \$1000 at 10% p.a.



Interest is about \$690

5a Compound interest on \$5000



b i \$50

ii \$100

iii \$150

c i \$152

ii \$306

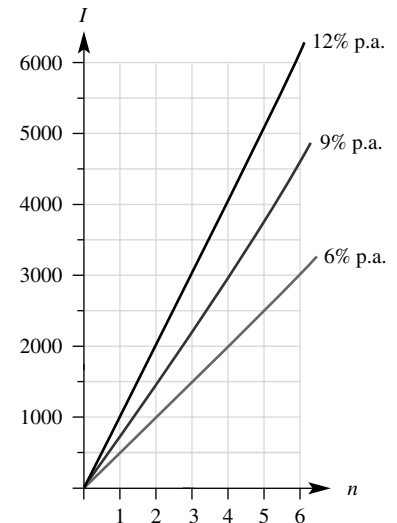
iii \$463

d i about 4 quarters

ii about 2 quarters

iii about 1.3 quarters

6a Compound interest on \$100 000



b i \$1003

ii \$1506

iii \$2010

c i \$3038

ii \$4585

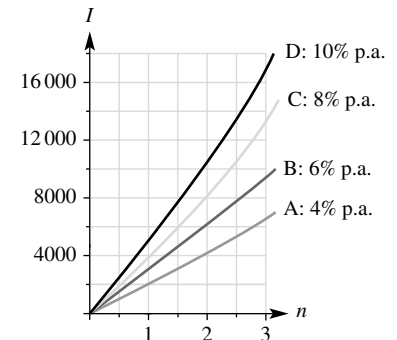
iii \$6152

d i 6 months

ii 4 months

iii 3 months

7a Compound interest on \$50 000



b About \$6100

c About \$6000

d Just under 2 years

Exercise 3F

1 \$88373.39

2 \$535092.25

3a \$5151.43

b \$7543.25

c \$1764.48

4 \$2360.28

5 \$1900

6 \$1174287

7 \$1519

8 \$498

9 \$5144

- 10 \$1954
 11 \$554
 12 \$478
 13a \$4.14 b \$3.83
 c \$5.22 d \$6.03
 14a \$340342 b \$923785
 c \$393824 d \$704994
 e \$1531538 f \$1162024
 15a \$41327 b \$27349
 c \$79008 d \$24298
 e \$145861 f \$69527
 16a About \$140 b \$180
 c \$50 d About \$22

Review 3

Multiple-choice

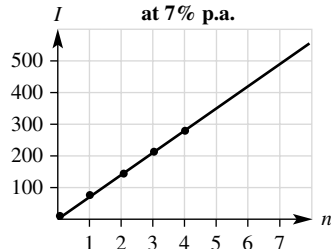
- 1 C 2 B 3 C 4 C 5 A
 6 D 7 A 8 B 9 D

Short-answer

- 1 \$96000
 2 \$2600
 3 \$18
 4 \$8820
 5a $I = 70n$

n	0	1	2	3	4
I	0	70	140	210	280

cd Simple interest on \$1000 at 7% p.a.

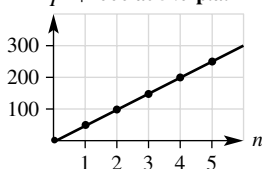


- e \$175 f \$420 g 3 years

- 6a $I = 50n$

n	0	1	2	3	4	5
I	0	50	100	150	200	250

cd Simple interest on \$1000 at 5% p.a.



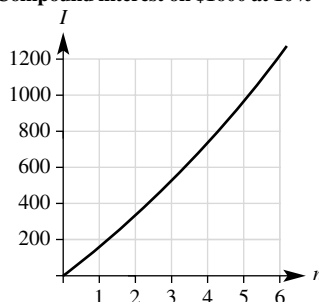
- e \$275

- 7a \$1118.27 b \$2520.54
 8a \$22524.07 b \$6664.49
 9 \$62360.95

- 10a $FV = 1600 \times (1.10)^n$
 b $I = 1600 \times (1.01)^n - 1600$
 c

n	0	1	2	3	4	5	6
FV	1600	1760	1936	2130	2343	2577	2834
I	0	176	336	530	743	977	1234

de Compound interest on \$1600 at 10% p.a.



- f about \$250

- 11a \$710517 b \$230517
 12a \$3.02 b \$4.95
 c \$6.46 d \$1.72
 e \$4.85 f \$9.58

Chapter 4

Exercise 4A

- 1a 10.0cm b 13.0cm
 c 26.0mm d 22.4mm
 e 4.9cm f 83.1cm
 2a 9.00cm b 14.70cm
 c 11.53mm d 21.17mm
 e 4.21cm f 10.42cm
 3a $y = 55\text{mm}$ b $b = 55\text{mm}$
 c $x = 23\text{mm}$ d $d = 25\text{mm}$
 e $b = 62\text{mm}$ f $m = 14\text{mm}$
 g 24mm h 2mm
 i 16mm
 4a 9.0m
 5a $y = 5.74\text{cm}$ b $x = 8.31\text{cm}$

Exercise 4B

- 1 Width of gate is 2.5m
 2 Length of ladder is 3.9m

- 3 Height is 4.2m
 4 Length is 11.2m
 5 $AC = 20\text{m}$
 6 Fence is 55.902m
 7 Distance is 49m
 8 Side length is 34.64cm

Exercise 4C

- 1a $h = 10, o = 8, a = 6$
 b $h = 13, o = 12, a = 5$
 c $h = 5, o = 3, a = 4$
 d $h = 39, o = 15, a = 36$
 e $h = 15, o = 9, a = 12$
 f $h = 30, o = 24, a = 18$

- 2a $h = z, o = x, a = y$

- b $h = c, o = a, a = b$

- c $h = f, o = e, a = d$

- 3a $\sin \theta = \frac{4}{5}, \cos \theta = \frac{3}{5},$

$$\tan \theta = \frac{4}{3}$$

- b $\sin \theta = \frac{12}{13}, \cos \theta = \frac{5}{13},$

$$\tan \theta = \frac{12}{5}$$

- c $\sin \theta = \frac{3}{5}, \cos \theta = \frac{4}{5},$

$$\tan \theta = \frac{3}{4}$$

- d $\sin \theta = \frac{15}{39}, \cos \theta = \frac{36}{39},$

$$\tan \theta = \frac{15}{36}$$

- e $\sin \theta = \frac{9}{15}, \cos \theta = \frac{12}{15},$

$$\tan \theta = \frac{9}{12}$$

- f $\sin \theta = \frac{12}{15}, \cos \theta = \frac{9}{15},$

$$\tan \theta = \frac{12}{9}$$

- 4a $\sin \theta = \frac{x}{z}, \cos \theta = \frac{y}{z}, \tan \theta = \frac{x}{y}$

- b $\sin \theta = \frac{a}{c}, \cos \theta = \frac{b}{c}, \tan \theta = \frac{a}{b}$

- c $\sin \theta = \frac{e}{f}, \cos \theta = \frac{d}{f}, \tan \theta = \frac{e}{d}$

- 5a i $\sin \theta$ ii $\cos \theta$ iii $\tan \theta$

- b i $\cos \theta$ ii $\tan \theta$ iii $\sin \theta$

6a i $\sin \theta = \frac{11}{61}, \cos \theta = \frac{60}{61},$

$\tan \theta = \frac{11}{60}$

ii $\sin \phi = \frac{60}{61}, \cos \phi = \frac{11}{61},$

$\tan \phi = \frac{60}{11}$

b i $\sin \theta = \frac{3}{5}, \cos \theta = \frac{4}{5}, \tan \theta = \frac{3}{4}$

ii $\sin \phi = \frac{4}{5}, \cos \phi = \frac{3}{5}, \tan \phi = \frac{4}{3}$

c i $\sin \theta = \frac{8}{17}, \cos \theta = \frac{15}{17},$

$\tan \theta = \frac{8}{15}$

ii $\sin \phi = \frac{15}{17}, \cos \phi = \frac{8}{17},$

$\tan \phi = \frac{15}{8}$

d i $\sin \theta = \frac{q}{r}, \cos \theta = \frac{p}{r}, \tan \theta = \frac{q}{p}$

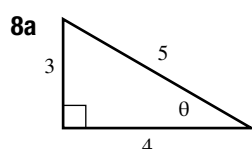
ii $\sin \phi = \frac{p}{r}, \cos \phi = \frac{q}{r}, \tan \phi = \frac{p}{q}$

7a $\sin A = \frac{15}{17}, \cos A = \frac{8}{17},$

$\sin B = \frac{8}{17}, \cos B = \frac{15}{17}$

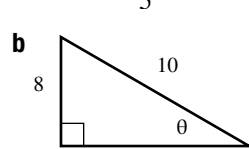
b $\sin A = \frac{3}{5}, \cos A = \frac{4}{5}, \sin B = \frac{4}{5},$

$\cos B = \frac{3}{5}$



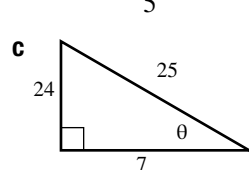
i 5

ii $\sin \theta = \frac{3}{5}, \cos \theta = \frac{4}{5}$



i 6

ii $\cos \theta = \frac{3}{5}, \tan \theta = \frac{4}{3}$



i 24

ii $\sin \theta = \frac{24}{25}, \tan \theta = \frac{24}{7}$

9a Hypotenuse is 4 and 6. Adjacent is 2 & 3. Opposite is 3.46 and 5.20.

b $\cos \theta = 0.5$ **c** $\sin \theta = 0.87$

Exercise 4D

1a 60' **b** 180' **c** 300'

d 420' **e** 600' **f** 900'

g 1200' **h** 3600' **i** 30'

j 20' **k** 12' **l** 15'

2a 2° **b** 8° **c** 1°

d 10° **e** 6° **f** 4°

g 15° **h** 12° **i** 0.5°

j 0.25° **k** 0.75° **l** 0.33°

3a 0.34 **b** 0.73 **c** 2.14

d 0.31 **e** 0.23 **f** 0.99

g 0.97 **h** 1.11

4a 0.45 **b** 0.65 **c** 0.61

d 0.71 **e** 0.39 **f** 1.36

g 2.48 **h** 0.41

5a 3.5 **b** 4.0 **c** 4.8

d 5.9 **e** 26.0 **f** 1.5

g 1.7 **h** 12.4

6a 3.6 **b** 2.2 **c** 11.8

d 2.9 **e** 4.0 **f** 5.9

g 1.7 **h** 6.6

7a 5.96 **b** 1.12 **c** 13.24

d 4.48 **e** 5.09 **f** 1.57

g 7.25 **h** 21.80

8a 35° **b** 81° **c** 16°

d 38° **e** 27° **f** 7°

9a 21°16' **b** 40°13' **c** 81°46'

d 59°54' **e** 67°36' **f** 41°44'

10a 37° **b** 30° **c** 51°

d 76° **e** 37° **f** 53°

11a 60° **b** 24° **c** 68°

d 59° **e** 30° **f** 45°

12a 40°54' **b** 25°40' **c** 10°33'

d 22°12' **e** 11°25' **f** 25°14'

13a 24° **b** 0.9 **c** 0.44

14a 37° **b** 0.6 **c** 0.75

15a 64°32' **b** 0.903 **c** 0.4299

Exercise 4E

1a 7.73 **b** 17.09 **c** 14.24

d 8.39 **e** 65.82 **f** 12.37

g 51.31 **h** 30.18 **i** 7.88

2a 24.38 **b** 33.16 **c** 30.55

d 16.68 **e** 16.67 **f** 4.75

3a 50.81 **b** 6.73 **c** 141.38

d 61.58 **e** 95.78 **f** 15.84

4a 68.4 **b** 90.9 **c** 126.8

d 25.5 **e** 66.7 **f** 88.7

5a 175.918 **b** 105.541 **c** 10.251

Exercise 4F

1a 47° **b** 47° **c** 25°

d 67° **e** 52° **f** 40°

g 49° **h** 56° **i** 55°

2a 51° **b** 51° **c** 50°

d 58° **e** 47° **f** 43°

3a 51°19' **b** 57°22' **c** 48°39'

d 47°15' **e** 23°49' **f** 32°35'

4a 50° **b** 32° **c** 61°

5a 53° **b** 62° **c** 44°

6a $\theta = 67^\circ 23', \phi = 22^\circ 37'$

b $\theta = 28^\circ 4', \phi = 61^\circ 56'$

c $\theta = 36^\circ 52', \phi = 53^\circ 8'$

Exercise 4G

1 Height is 15.0m

2 Pole is 4.50m high

3 River is 40m wide

4 Depth is 40.2m

5 Angle is 34°

6 Angle is 44°

7a Horizontal distance is 3.8km

b Height is 1.3km

8 Ramp is 8.77m

9 Angle is 1°26'

10 Length of the rope is 6.6m

11a Ladders reach 3.83m

b Angle is 33°

12 Angle is 38°

Exercise 4H

1 Height is 752m

2 Height of the tower is 116.5m

3 Boat is 107.23m from the base of the cliff

4 Plane was 17326m from the airport

5 Height of the tree is 55.6m

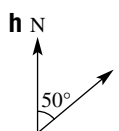
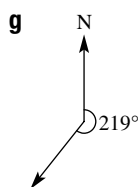
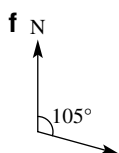
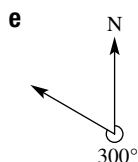
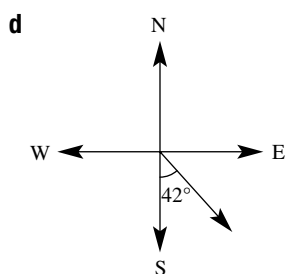
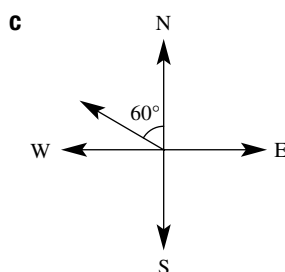
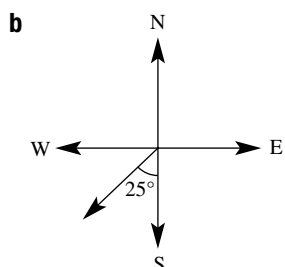
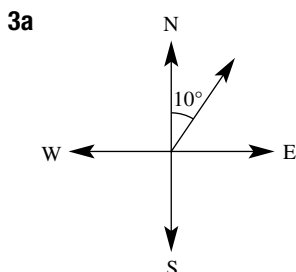
6 Depth of the shaft is 74m

7 Height of tree is 35m

- 8 Angle of depression is 9°
 9 Angle of elevation is 23°
 10 Angle of elevation is 34°
 11 Angle of depression is 2.5°
 12 Angle of elevation is 3°
 13 Angle of elevation is 34°
 14 Angle of depression is 47°
 15 Height of the tree is 10m
 16 Angle of depression is $20^\circ 58'$

Exercise 4I

- 1a $N45^\circ E, 045^\circ$
 b $N45^\circ W, 315^\circ$
 c $S45^\circ E, 135^\circ$
 d $S45^\circ W, 225^\circ$
 2a $N52^\circ E, 052^\circ$
 b $N63^\circ W, 297^\circ$
 c $S55^\circ E, 125^\circ$
 d $S57^\circ W, 237^\circ$
 e $N70^\circ E, 070^\circ$
 f $N55^\circ W, 305^\circ$
 g $N59^\circ E, 059^\circ$
 h $N78^\circ W, 282^\circ$
 i $S82^\circ E, 098^\circ$
 j $S60^\circ W, 240^\circ$
 k $N77^\circ W, 283^\circ$
 l $S70^\circ E, 110^\circ$



4 Aaron has run 5.1 km.

5a $N30^\circ E$ b 210° c $S30^\circ W$

6a 045° b 315° c 200°

7a $x = 52$ and $y = 41$

b $N49^\circ W$

c 311°

8a 106km b 66km

9a 58° b 212° c $S32^\circ W$

10a 124.2km b 57.9km

Review 4

Multiple-choice

- | | | | |
|-----|-----|-----|-----|
| 1 B | 2 B | 3 A | 4 B |
| 5 C | 6 A | 7 D | 8 D |

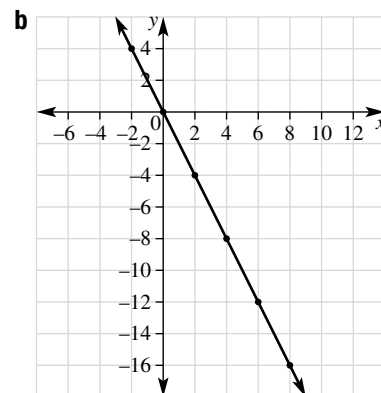
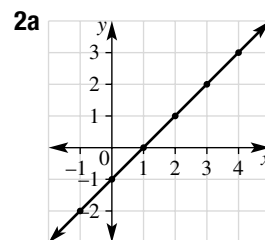
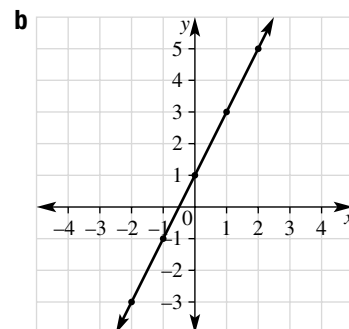
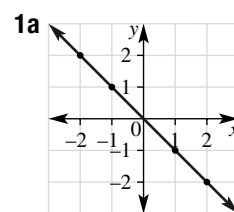
Short-answer

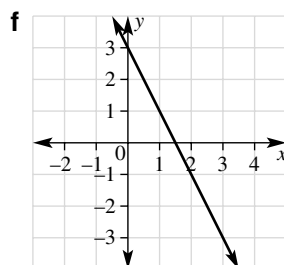
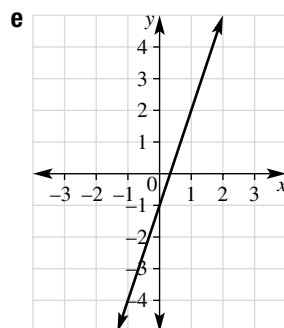
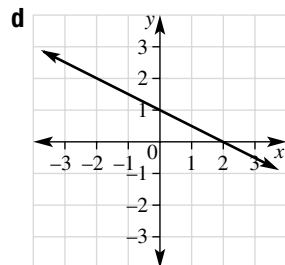
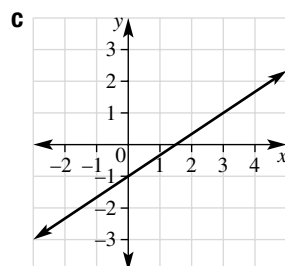
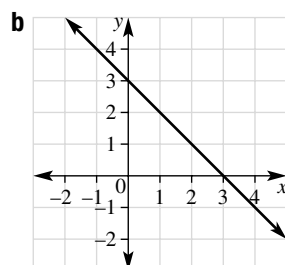
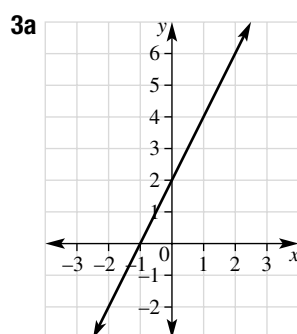
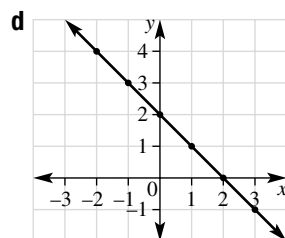
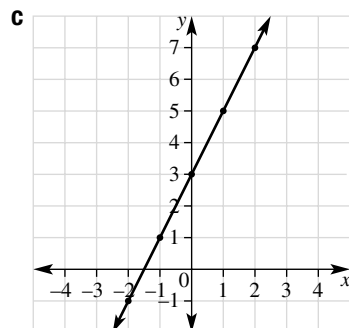
- | | | |
|--------------------|-------------------|-------------------|
| 1a 35 | b 15.65 | c 38.47 |
| 2 Fence is 33.6m | | |
| 3 10mm | | |
| 4a 30 | b 24 | c 18 |
| 5a $\frac{20}{29}$ | b $\frac{21}{29}$ | c $\frac{20}{21}$ |

- | | | |
|--------------------|------------------|------------------|
| 6a $\frac{12}{13}$ | b $\frac{5}{13}$ | c $\frac{12}{5}$ |
| 7a 2.48 | b 0.97 | c 0.39 d 0.14 |
| 8a 61° | b 19° | c 11° |
| 9a 29.02 | b 20.73 | c 11.47 |
| d 8.58 | e 21.38 | f 85.99 |
| 10a $28^\circ 4'$ | b $61^\circ 56'$ | c $51^\circ 18'$ |
| d $47^\circ 44'$ | e $36^\circ 52'$ | f $53^\circ 8'$ |
- 11 103.2m from the base of the cliff
- 12a 6.2km b 5.8km

Chapter 5

Exercise 5A





4a 5 **b** 1 **c** -2

d $\frac{1}{2}$ **e** $-\frac{2}{3}$ **f** $\frac{3}{4}$

5a -5 **b** 2 **c** 0

d -1 **e** 7 **f** $\frac{3}{5}$

6a $y = 2x + 1$ **b** $y = -3x + 4$

c $y = 0.5x - 2$ **d** $y = 6$

e $y = -\frac{2}{5}x + 4$ **f** $y = \frac{1}{3}x$

7a $y = \frac{1}{2}x + 1$ **b** $y = -2x + 1$

c $y = x + 2$ **d** $y = -\frac{1}{2}x + 2$

e $y = x$ **f** $y = -2x + 10$

g $y = 2x - 2$ **h** $y = -\frac{2}{3}x - 4$

i $y = x - 3$

8a Not parallel **b** Not parallel

c Parallel **d** Parallel

9a $y = -x + 3$ **b** $y = 2x + 4$

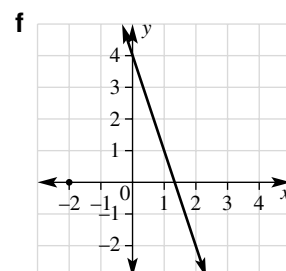
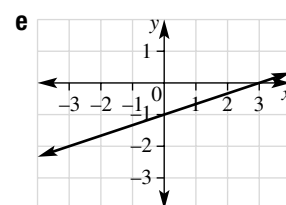
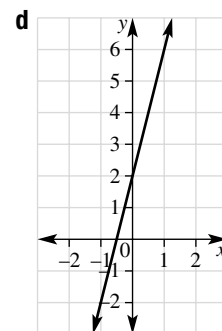
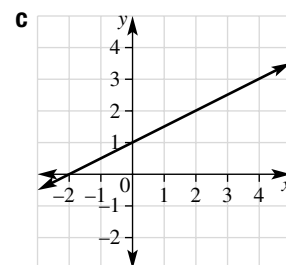
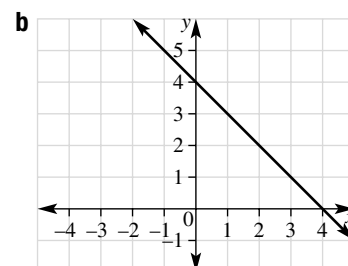
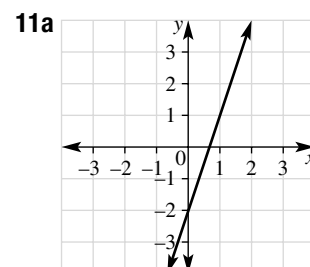
c $y = -x + 2$ **d** $y = x - 1$

e $y = 3x + 3$ **f** $y = -\frac{1}{2}x + 4$

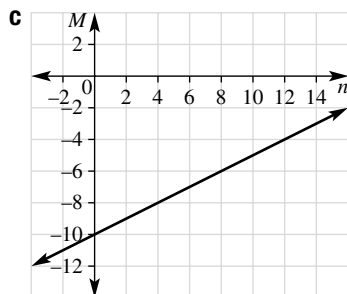
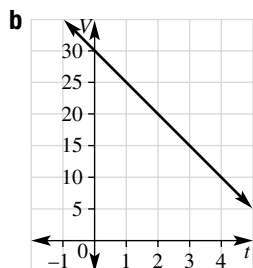
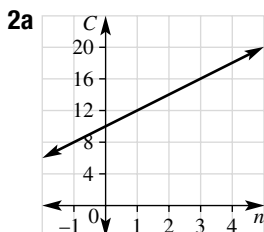
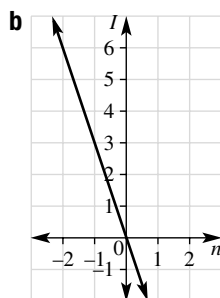
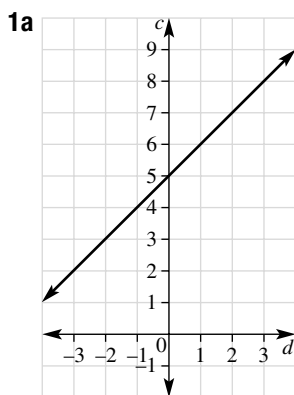
10a $y = 3x - 2$ **b** $y = -x + 4$

c $y = \frac{1}{2}x + 1$ **d** $y = 4x + 2$

e $y = \frac{1}{3}x - 1$ **f** $y = -3x + 4$



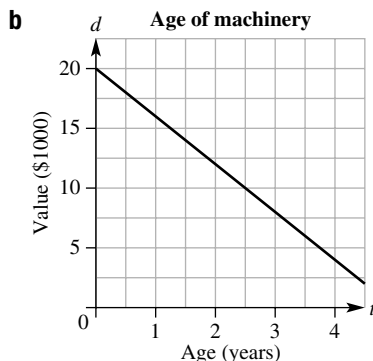
Exercise 5B



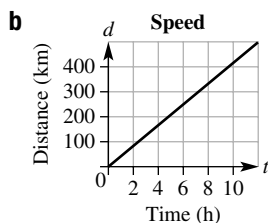
- 3a** i 18 GBP ii 30 GBP
 iii 33 AUD iv 17 AUD
b $m = \frac{3}{5}$ or 0.6

4a

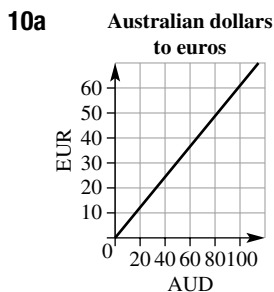
a	0	1	2	3	4
v	20	16	12	8	4



- c** \$20000 **d** 1.25 years
e \$6000 **f** \$12000
g 2.5 years
5a \$90000
b \$60000
c 100 months
d $v = -1.5t + 150$
e \$141000
6a $d = 40t$



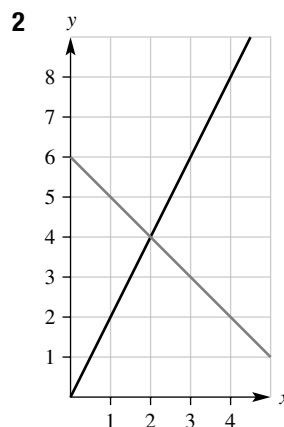
- 7** $C = 1.5n + 2.6$
8 $w = 20n + 350$
9 $C = 25n + 4000$



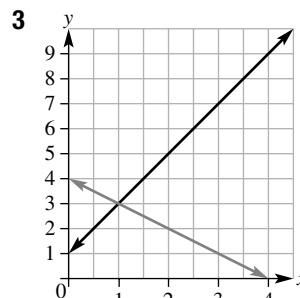
- b** 15 EUR
c 75 AUD
d Gradient is 0.6 and the vertical intercept is 0.
e $\text{EUR} = 0.6 \times \text{AUD}$

Exercise 5C

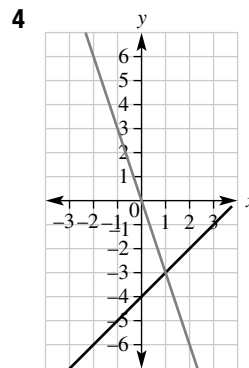
- 1a** $(-1, 2)$ **b** $(2, 0)$
c $(-2, 0)$ **d** $(0, 1)$



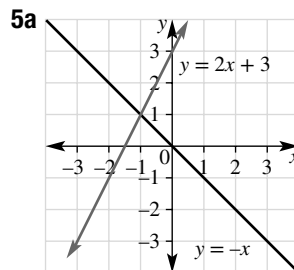
The point of intersection is $(2, 4)$



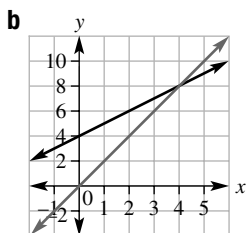
The point of intersection is $(1, 3)$



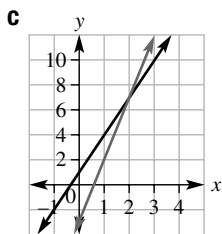
The point of intersection is $(1, -3)$



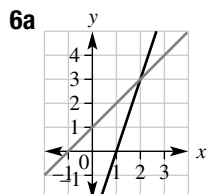
$\therefore$ Simultaneous solution is $x = -1$
 and $y = 1$



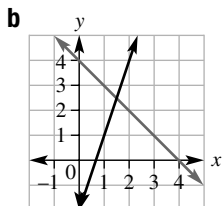
$\therefore$ Simultaneous solution is $x = 4$ and $y = 8$



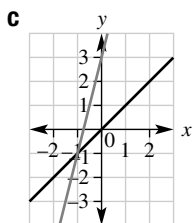
$\therefore$ Simultaneous solution is $x = 2$ and $y = 7$



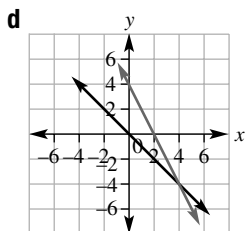
$\therefore$ Simultaneous solution is $x = 2$ and $y = 3$



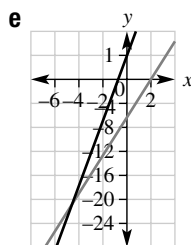
$\therefore$ Simultaneous solution is $x = 1\frac{1}{2}$ and $y = 2\frac{1}{2}$



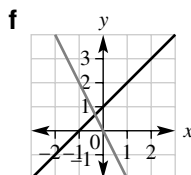
$\therefore$ Simultaneous solution is $x = -1$ and $y = -1$



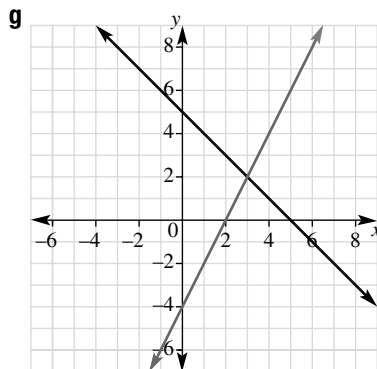
$\therefore$ Simultaneous solution is $x = 4$ and $y = -4$



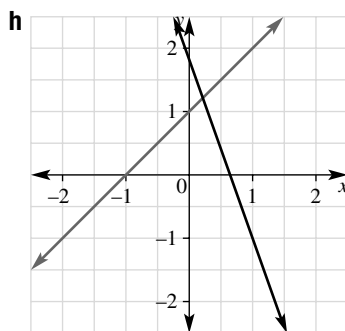
$\therefore$ Simultaneous solution is $x = -4$ and $y = -19$



$\therefore$ Simultaneous solution is $x = -\frac{1}{3}$ and $y = \frac{2}{3}$



$\therefore$ Simultaneous solution is $x = 3$ and $y = 2$

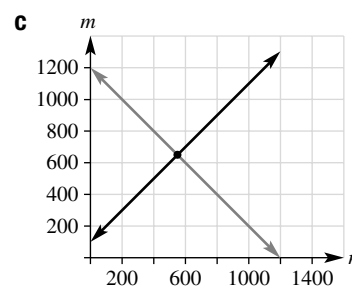


$\therefore$ Simultaneous solution is $x = \frac{1}{4}$ and $y = \frac{5}{4}$

Exercise 5D

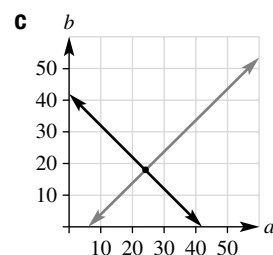
1a $m = n + 100$

b $m + n = 1200$



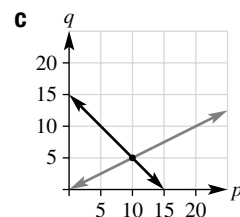
d Matilda's wage is \$650 and Nathan's wage is \$550.

2a $a + b = 42$ b $a - b = 6$



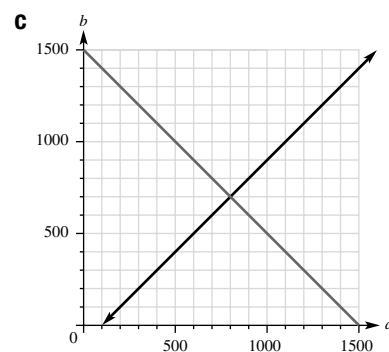
d The numbers are 18 and 24.

3a $p + q = 15$ b $p = 2q$



d The numbers are 5 and 10.

4a $a = 100 + b$ b $a + b = 1500$



d Amy's wage is \$800 and Nghi's wage is \$700.

5a i $C = 1000 + 10n$

ii $I = 60n$

b 20 items

Exercise 5E

1a 2 shirts

b 6 printers

2a 2 boxes

b \$10 profit

c \$10 loss

d \$20

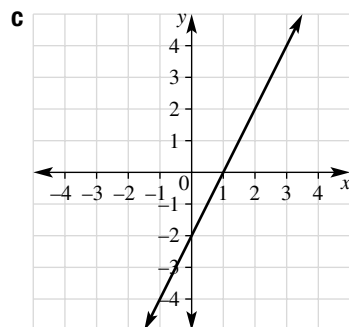
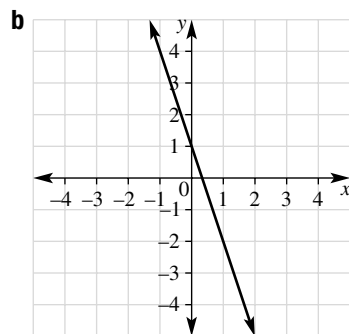
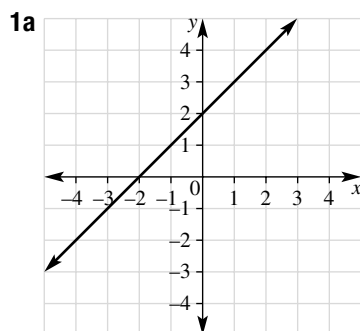
- 3a** 4 cartons to break even.
b Profit of \$5
c Loss of \$10
d Initial costs are \$20
e Gradient is 10
f Vertical intercept is \$0
g $I = 10n$
h Gradient is 5
i Vertical intercept is \$20
j $C = 5n + 20$

Review 5

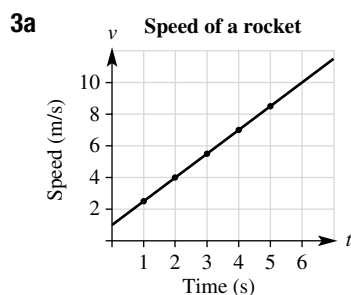
Multiple-choice

- 1** A **2** C **3** A **4** D **5** C
6 B **7** B **8** A **9** C

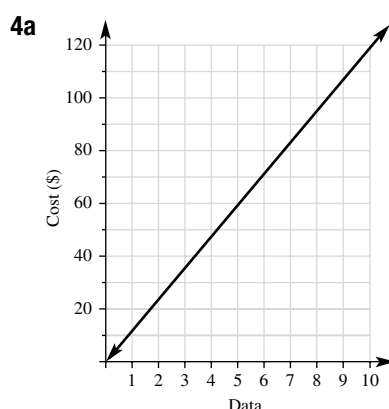
Short answer



- 2a** $y = 3x - 2$
b $y = -\frac{1}{2}x + 1$



- b** $v = 1.5t + 1$ **c** 4.75 m/s
d 10 m/s **e** 11.5 m/s
f 16 m/s



- b** 2.5 GB **c** \$42
d \$84 **e** \$120
f \$102
5 $(-2.5, -4.5)$
6a 3
b loss of about \$17
c profit of about \$8
d \$28
7a 10
b loss of \$50
c Profit of \$100
d \$100
8a 5 **b** $I = 40n$
c $C = 20n + 100$ **d** \$100 profit
e \$20 loss **f** \$220 profit

Practice paper 1

- 1** D **2** C **3** D
4 A **5** B **6** C
7 D **8** A **9** D
10 C **11** A **12** B
13 C **14** A **15** B
16a i \$2.38 **ii** \$294

- b i** Eulerian circuit does not exist.
 Graph has vertices with odd degree.

- ii** 21 **iii** 16
iv 20
v $E-F-C-D-A-B-E$ or $E-B-A-D-C-F-E$ length is 44

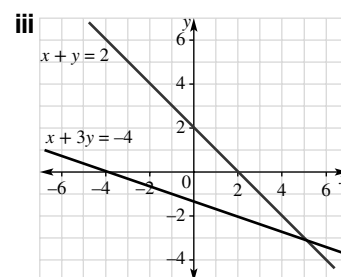
c \$1620

d i

x	-4	-1	0	2	6
y	0	-1	$-\frac{4}{3}$	-2	$-\frac{10}{3}$

ii

x	-2	-1	0	1	2
y	4	3	2	1	0



iv $(5, -3)$

17a i 37°

- ii** $BD = 3$ cm and
 $ABD = 7.42$ cm

b i 2

ii Loss of \$10

iii Profit of \$20

iv \$20

c 135 km

d i 5

- ii** A Hamiltonian path passes through every vertex of a graph once and only once.

iii One example is $A-B-D-E-C$

e i -2

ii -2

iii $(-2, 2)$

18a i 792L

ii 1170L

iii \$1211.76

iv \$1965.60

b $x = 7.2$ m and $y = 6.5$ m

c i \$62640

ii \$352640

iii \$358556

d i Eulerian circuit

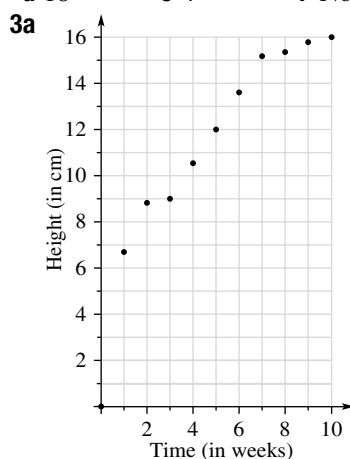
- ii** All vertices in the network graph are even.

- iii One possible route: Reservoir–
B–A–C–D–E–C–B–E–F–
Reservoir
iv 32 km

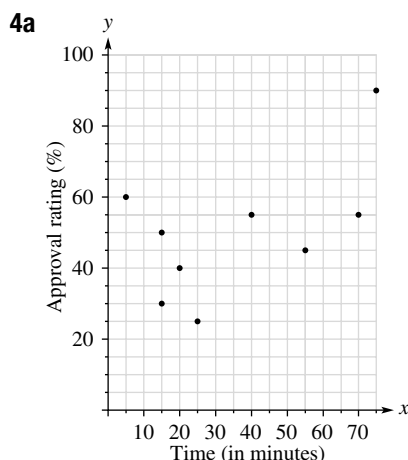
Chapter 6

Exercise 6A

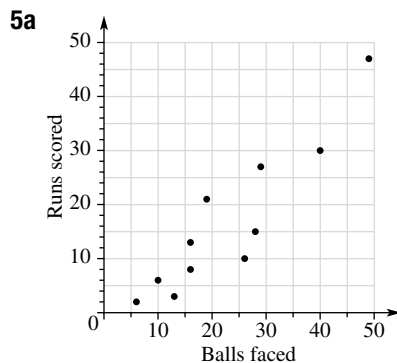
- 1a 9 b 2 c 16
d 9 e 12
2a 23 cm b 24 c 24 cm
d 18 e 4 f No



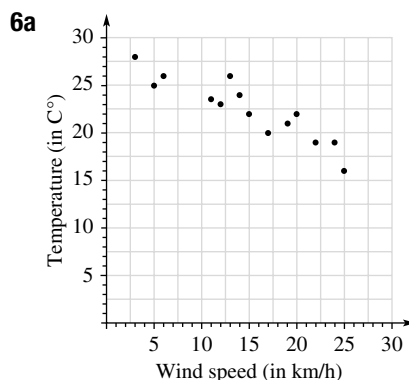
- b 6.6 cm
c 0.1 cm
d 2 weeks
e 11 cm
f 6.5 weeks



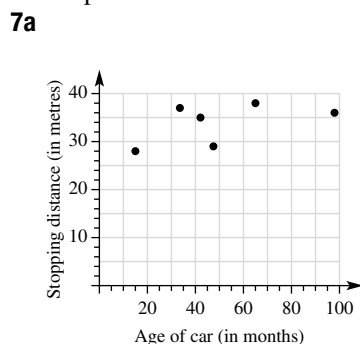
- b There is no clear relationship.
However, it could be argued that
the more a politician appears
on television the greater the
approval rating.



- b As the balls faced increased,
the number of runs increased.



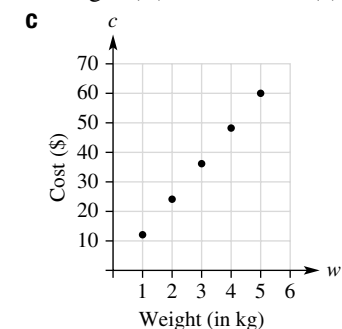
- b As the wind speed increases, the
temperature decreases.



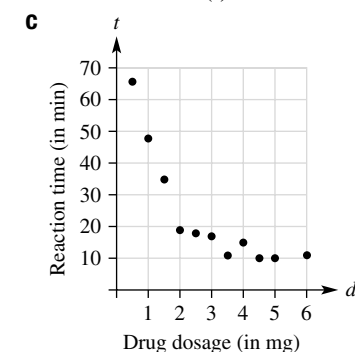
- b Data is only provided for six
cars, which makes predictions
unreliable. Furthermore, other
factors affect the result such as
the type of car, road conditions
and car servicing.

Exercise 6B

- 1a i Linear
ii Positive
iii Strong
b i Linear
ii Negative
iii Strong
c i Linear
ii Positive
iii Moderate or weak
d i Non-linear
ii Positive
iii Moderate
e i Linear
ii Negative
iii Weak
f i Linear
ii Positive
iii Moderate
2a Positive associated
b Positively associated
c No association
d Positively associated
e Negatively associated
3a Weight (w) b Cost (c)

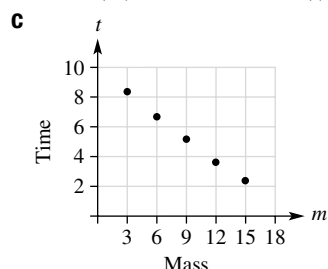


- d Linear
e Positive
f Strong
4a Drug dosage (d)
b Reaction time (t)



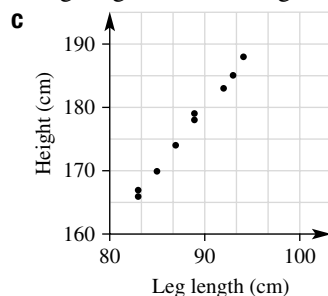
- d** Non-linear
e Negative
f Moderate

5a Mass (m) **b** Time (t)



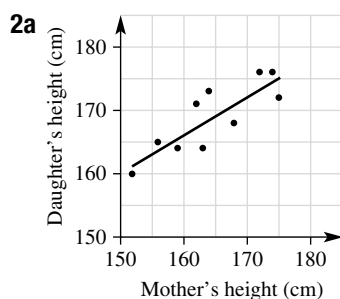
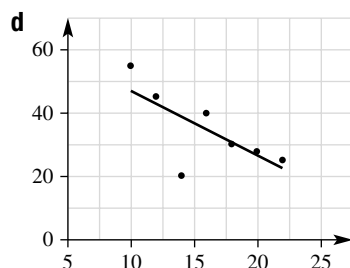
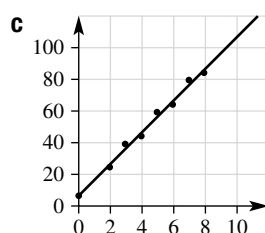
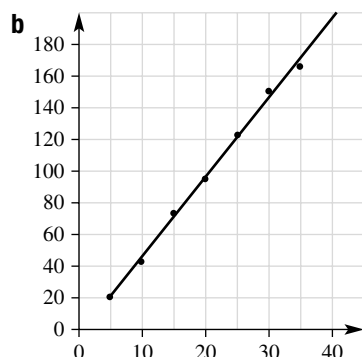
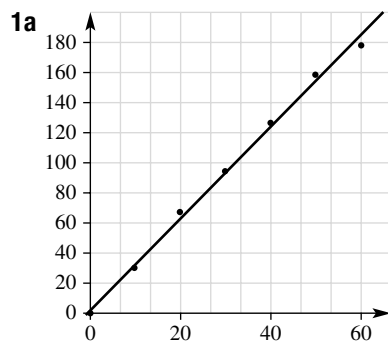
- d** Linear
e Negative
f Strong

6a Leg length **b** Height

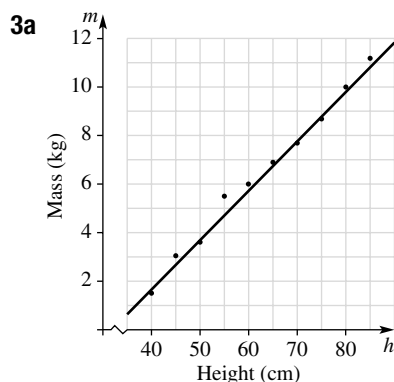


- d** Linear
e Positive
f Strong

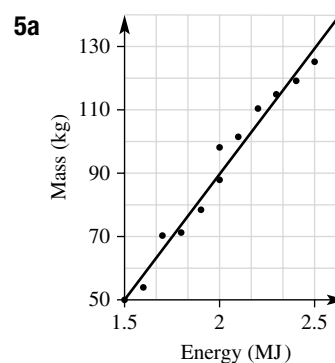
Exercise 6C



- b** strong
c 172cm
d 154cm



- b** 8.5kg
c 54.9cm
d 3.4kg
e 75.7cm
4a Shown on spreadsheet
b 67.12 beats per minute
c 53.875kg



- b** Shown on the above scatterplot
c About 54kg
d About 102kg
e About 2.1 MJ
f About 1.9 MJ

Exercise 6D

- 1a** 3 days
b 20%
c i 110mm
 ii 70mm
 iii 60mm
d i 17%
 ii 13%
 iii 8%
2a \$29000 **b** 3 countries
c i \$22000
 ii \$27000
 iii \$33000
d i \$32000
 ii \$49000
 iii \$65000
3a 10 errors (interpolation)
b 4 errors (extrapolation)
c -1 error (interpolation)
4a 19.7°C (interpolation)
b 26.4°C (interpolation)
c 33.1°C (extrapolation)
5a 45.22 (interpolation)
b 55.72 (interpolation)
c 38.92 (extrapolation)
d 66.22 (interpolation)
e 72.52 (extrapolation)
f 59.92 (interpolation)
6a 46.87kg (extrapolation)
b 65.62kg (interpolation)
c 84.37kg (extrapolation)

- 7a** 92.18% (extrapolation)
b 86.74% (interpolation)
c 84.02% (interpolation)
8a 12030 (interpolation)
b 18730 (interpolation)
c 25430 (interpolation)

Exercise 6E

- 1a** Investigation **b** Population
c Sample **d** Presentation
e Bivariate **f** Skewed
2a True **b** True
c True **d** True
e False **f** False
3 A statistical investigation involves four steps: collecting data, organising data, summarising and displaying data, and analysing data.
4 Census is data is collected from the whole population. A survey is data is collected from a smaller group of the population.
5 Several checks should be made to limit the impact of bias. This includes how the data is collected and whether this is likely to influence who responds and how they respond. Also to compare the demographics of survey respondents to the general population to check whether the sample is representative.
6 Since the number of car accidents and the number of school teachers will both increase with the size of the city, then the size of the city is likely to explain this correlation.
7 Not necessarily. While one possible explanation is that religion is encouraging people to drink, a better explanation is that towns with a large number of churches also have large populations, thus explaining

that larger amount of alcohol consumed. Town size is the probable common cause for this association.

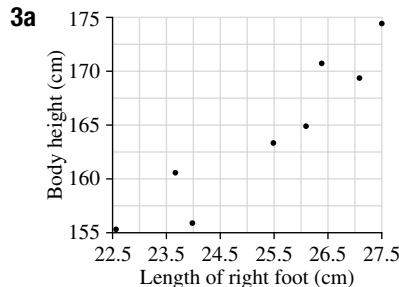
Review 6

Multiple-choice

1 A **2** A **3** C **4** B **5** C

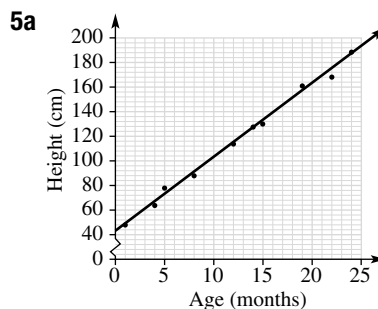
Short-answer

- 1a** Navel height **b** Body height
c Linear **d** Moderate
e 188cm **f** 100cm
g 182cm
2a 7 years **b** 145cm
c Positive **d** Strong

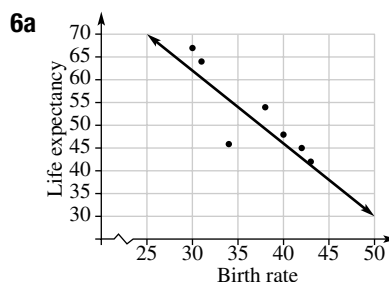


- b** Positive
c Strong

4a 56 **b** 92



- b** About 110cm
c About 80cm
d Interpolation



- b** Negative

- c** Strong
d About 54
e About 31

Chapter 7

Exercise 7A

- 1a** 12 **b** 14 **c** 4
d 9 **e** 2 **f** 4
g 2 **h** 10 **i** 77
2a 4 : 8 : 12 **b** 2 : 6 : 8
c 7 : 49 : 63
3 Answers may vary.
a 2 : 4, 3 : 6, 5 : 10
b 4 : 10, 20 : 50, 200 : 500
c 4 : 3, 16 : 12, 40 : 30
4a 5 : 1 **b** 1 : 4 **c** 3 : 2
d 7 : 15 **e** 2 : 3 **f** 7 : 2
g 3 : 1 **h** 3 : 2 **i** 1 : 3
j 1 : 2 : 1 **k** 1 : 2 : 4 **l** 9 : 3 : 1
5a 4 : 3 **b** 1 : 4 **c** 7 : 2
d 5 : 9 **e** 1 : 8 **f** 1 : 5
g 4 : 1 **h** 6 : 1 **i** 20 : 1
j 10 : 3 **k** 1 : 6 **l** 40 : 9
6a 7 : 5 **b** 5 : 7 **c** 7 : 12
7 1 : 5
8 9 : 5
9 2 : 5
10a \$2.56 **b** \$25.60
c \$35.84 **d** \$15.36
11a \$14.20 **b** \$56.80
c \$85.20 **d** \$142.00
12a 1 : 10 **b** 1 : 9
13a 5 : 2 **b** 14 : 9 **c** 3 : 4
d 5 : 1 **e** 1 : 2 **f** 10 : 9
g 4 : 3 **h** 2 : 3 **i** 9 : 10
14a 2 : 1 **b** 1 : 3 **c** 2a : 1
d 1 : 2 **e** y : 4 **f** 7m : 1
15 5 : 7 : 3
16 10 : 7 : 5
17a 3 : 2 **b** \$900 **c** \$1740

Exercise 7B

- 1a** 11 **b** 6 **c** 14 **d** 9
2a $\frac{2}{9}$ **b** $\frac{7}{9}$

3a \$70 : \$30 **b** \$40 : \$60
c \$55 : \$45
d \$28 : \$32 : \$40

4a 160 : 80 **b** 144 : 96
c 40 : 200 **d** 140 : 100

5a \$16 : \$4 **b** \$14 : \$6
c \$5 : \$10

d 33 drinks : 44 drinks

e 35 lollies : 65 lollies

f 20kg : 25kg

g 100 books : 60 books

h 80 pencils : 280 pencils

i 12.5g : 37.5g

j 32km : 28km

6 150g

7 5026

8a \$40 : \$80 : \$80

b \$50 : \$150 : \$200

c 2kg : 4kg : 6kg

d 22kg : 11kg : 55kg

e 132kg : 143kg : 165kg

f \$9000 : \$18000 : \$36000

9a \$60 : \$540

b \$200 : \$100 : \$300

c \$100 : \$250 : \$250

d \$260 : \$160 : \$180

10a \$120000 **b** \$100000

c \$20000

11 6km²

12 \$120

13 4200

14a 0.6L **b** 7.5L

15a \$218750 **b** \$156250

c \$125000

16 150g of flour and 100g of sugar

17 3t and 5.5t

18 A-230 t, B-322 t, C-230 t

19 $3\frac{1}{8}$ or 3.125kg

Exercise 7C

1 A-1, B-9, C-4, D-3,
 E-2, F-6, G-7, H-5, I-8

2a 2 **b** $\frac{1}{4}$ **c** 4 **d** $\frac{1}{3}$

e 1.5 **f** $\frac{1}{3}$

3a 2 **b** 3 **c** 15 **d** 30

4 Dimensions of the screen are
 108cm by 135cm

5a Corresponding angles of similar
 figures are equal.

b $\frac{1}{2}$ **c** 30cm

6a Corresponding angles of similar
 figures are equal.

b $\frac{2}{3}$ **c** 4.5m

7a 16cm² **b** 45m²

8a 3mm² **b** 3cm²

Exercise 7D

1a 2m **b** 1m

c 3.4m **d** 2.8m

e 8.5m **f** 4.9m

2a 80mm **b** 30mm

c 1.6mm **d** 140mm

e 2mm **f** 55mm

3a 1 : 2 **b** 1 : 50

c 1 : 300000

4a 200m **b** 100m **c** 50m

d 10m **e** 34m **f** 80m

5a 37.5km **b** 675km

6a 10mm **b** 16mm

c 20mm **d** 24mm

e 30mm **f** 48mm

7 Map distance is 7mm

8a 1125mm or 1.125m

b 0.04m or 40mm

9a 5 : 6400 or 1 : 1280

(approximation)

b Height of the antenna is
 approximately 32m

10a 10mm **b** 24mm

c 40mm **d** 600mm

e 80mm **f** 480mm

11a 1 : 1000 **b** 35m

c 16m **d** 13m

12a 1 to 1000 **b** 200m

c 15m

13a 1.5cm to 5000cm or 1 : 3333.33...

b 183m by 208m

c 153m **d** 60m **e** 137m

f 350m **g** 4110m²

14a 77m **b** 133m **c** 83m

d 432m **e** 11039m² **f** 157m

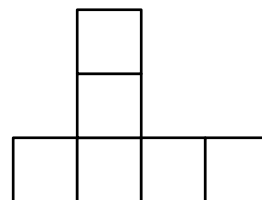
15a 33m **b** 10m **c** 209m

d 3421m² (3484m²)

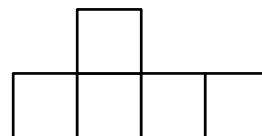
e 5m **f** 31m

Exercise 7E

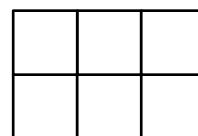
1a Plan



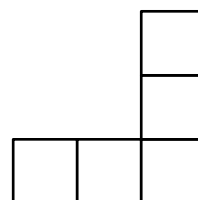
Front elevation



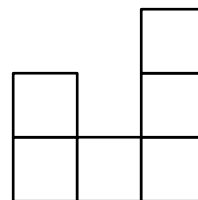
Side elevation



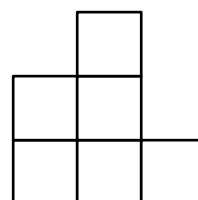
b Plan



Front elevation



Side elevation



2a Triangular prism

b Square pyramid

c Cylinder

- d Cube
e Cone
3

	Plan	Front elevation	Side elevation
a			
b			
c			
d			
e			
f			

4a Ensuite or bathroom



d Walk In Robe

5a $3\,150 \times 2\,700$ or 3.15 m by 2.7 m



d Refrigerator e Pantry

6a $3\,300 \times 2\,800$ or 3.3 m by 2.8 m



c Built In Wardrobe

d 3.3 m e 1 : 70

7a $4.15 \text{ m} \times 3.80 \text{ m}$ b

c 5.2 cm d 1 : 80

e $1.12 \text{ m} \times 0.72 \text{ m}$ f 15.77 m^2

8a $3\,500 \times 2\,990$ or 3.5 m by 2.99 m

b $4\,940 \times 4\,130$ or 4.94 m by 4.13 m

c 1 : 165 d 7.92 m

e 3 m^2 f 9 m^2

9a $2\,585 \text{ mm}^2$

b $2\,585\,000\,000 \text{ mm}^3$

c $5\,170\,000\,000 \text{ mm}^3$

10a 14 m b 9 m

- c 1 m by 2 m
d 200 cm by 160 cm
e $32\,000 \text{ cm}^2$
f $207\,000 \text{ cm}^2$
g $30\,000 \text{ cm}^2$

11a 2.44 m b 2.698 m

c 22.5° d 6

12a 14 m by 9 m b 126 m^2

c 25 m^3

13a 1 : 250

b 2.5 m by 5.0 m

c 6.8 m by 7.5 m

d 3.8 m by 3.8 m

e 25 m^2

f \$3 500

14a 1 : 175 b 13.5 m

c 90 m^2 d 1000

e Tiles will fit exactly into the three rooms and no breakage will occur.

f 13.5 m^3

Review 7

Multiple-choice

- 1 C 2 C 3 D 4 B 5 A
6 D 7 A 8 A 9 D

Short-answer

- 1a 15 b 12 c 121
d 39 e 10 f 16
2a False b False
c True d False
e True
3a 1 : 4 b 3 : 2 c 3 : 4 d 1 : 8
e 3 : 1 f 1 : 5 g 3 : 2 h 2 : 1
i 1 : 3 j 5 : 1 k 2 : 3 l 4 : 1
m 2 : 3 : 6 n 4 : 3 o 7 : 11 p 3 : 1
q 3 : 2 r 2 : 5
4a \$35 : \$45
b 40 kg : 160 kg
c 30 m : 10 m
d \$340 : \$595 : \$510
5 \$1 152
6a \$1 473 b \$1 408
7 12.5 buckets of sand

- 8a 9 cm b 12
9 154 cm
10a 1 : 300 b 1 : 60 c 1 : 2 500

11 500 mm

12 23 km

13a 80 mm b 25 mm

c 1 mm d 130 mm

e 0.4 mm f 42.5 mm

14a 720 m b 80 m c 20 m

d 84 m e 248 m f 24 m

15a 1 : 150



c Water closet or toilet

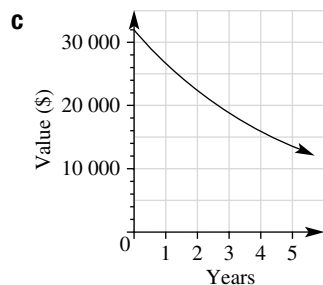
d 2.4 m by 3 m

Chapter 8

Exercise 8A

- 1a \$18 480.00 b \$15 523.20
c \$13 039.49
2 \$4740
3a \$6532 b \$10 968
4 \$32 752
5a \$5046 b \$14 854
6a \$4000 b \$1000
c 2.5 years d 3.5 years
e About \$1250 f About \$2600
7 \$9615
8a \$25 501 b \$13 537
9 \$166 303
10 \$25 884
11a \$5120
b

Year	Current value	Depreciation	Depreciated value
1	\$32 000	\$5 120	\$26 880
2	\$26 880	\$4 301	\$22 579
3	\$22 579	\$3 612	\$18 967
4	\$18 966	\$3 034	\$15 932
5	\$15 931	\$2 548	\$13 383



Exercise 8B

- 1a** \$801 **b** \$1974
c \$2120 **d** \$534
e \$2650
2a \$1590 **b** \$95 400
c \$20 400
3a \$5 096.40 **b** \$1966.80
c \$7911 **d** \$2856.60
4a \$573.65 **b** \$33 838
5a \$3655 **b** \$657 900
c \$317 900 **d** \$118 524
6a \$420 960 **b** \$240 960
7a \$100 000 **b** \$84 000
c \$68 000 **d** \$48 000
e about 84 months
f about 48 months
g 96 months

Exercise 8C

- 1a** \$5.05 **b** \$7.46
c \$85.82 **d** \$1.16
e \$0.72 **f** \$10.91
2a \$983.93 **b** \$987.87
c \$991.83 **d** \$995.80
e \$999.79 **f** \$1003.80
3a \$392.65 **b** \$501.71
c \$15.57 **d** \$3369.85
e \$61.15 **f** \$573.23
4 \$7.14
5 \$4.47
6 \$6899.88
7a \$543.12 **b** \$270.73
c \$1415.27 **d** \$483.80
e \$681.68
8a \$5.61 **b** \$3.17 **c** \$27.57
d \$16.67 **e** \$28.55
9a 0.05% **b** \$73.88

- 10a** 0.042% **b** \$650
c \$0.94 **d** \$1.03

Exercise 8D

- 1a** 21 Apr **b** \$172.91
c \$172.91 **d** \$10.00
e \$743.42 **f** \$0.00
g \$743.42 **h** \$4511.88
2a \$19 500.00 **b** \$3950.82
c 5 **d** \$15 549.18
e \$89.66 **f** \$72.53
g Myer **h** WW petrol
i 7 Dec **j** \$57.00
3a 5 **b** \$38.95
c 30 days **d** \$4892.08
e \$97.92 **f** \$0.06
4a \$5821.31 **b** \$12 000
c \$6361 **d** \$5638.25
e \$511.93 **f** \$86.26
g \$2.82 **h** \$1128.55

Exercise 8E

- 1a** \$457.50 **b** \$640
c \$595 **d** \$590
e \$600 **f** \$350
2a \$2.20 **b** \$16
c Bank B **d** Bank B
e \$4 **f** \$0.40
g \$228.75 **h** \$15.75
i i \$300 **ii** \$286
iii \$316 **iv** \$313
j i \$515 **ii** \$540
iii \$502 **iv** \$526
3 \$522

Review 8

Multiple-choice

- 1** C **2** D **3** C **4** B
5 B **6** D **7** A

Short-answer

- 1a** \$5046 **b** \$14 854
2a \$27 123 **b** \$6123
3 \$370 000
4 \$172.07

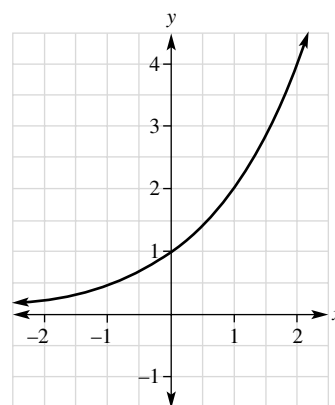
- 5a** \$436 **b** \$500
6a \$3.26 **b** \$1.45
c \$2.10
7a \$3696.05 **b** \$110.88
c \$3585.17 **d** \$100.00
e \$3685.17 **f** \$104.08
g \$81.30 **h** \$3970.11
i \$79.40 **j** \$160.39
8a No. \$699 worse off.
9 \$3.37
10 \$786

Chapter 9

Exercise 9A

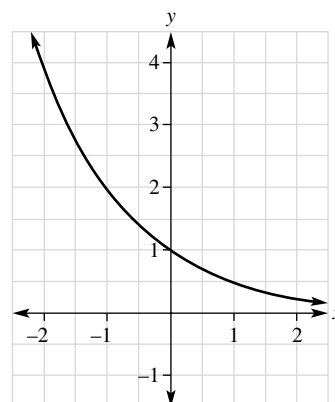
1a

x	-2	-1	0	1	2
y	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4



b

x	-2	-1	0	1	2
y	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$



2a No

b Yes

c Yes. The value of y is 1 when x equals 0.

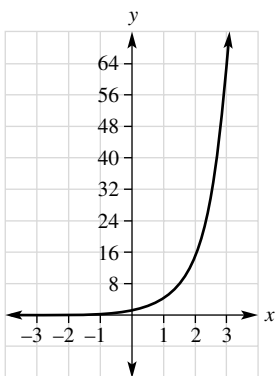
d No. The x -axis ($y = 0$) is an asymptote.

e 1.4

f 2.8

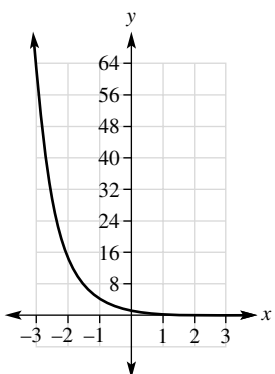
3a

x	-3	-2	-1	0	1	2	3
y	0.02	0.06	0.25	1	4	16	64



b

x	-3	-2	-1	0	1	2	3
y	64	16	4	1	0.25	0.06	0.02



4a No.

b Yes

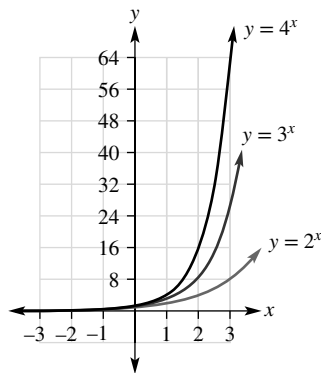
c Yes. The value of y is 1 when x equals 0.

d No. The x -axis ($y = 0$) is an asymptote.

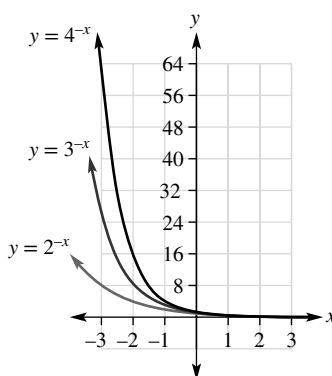
e 8

f 32

5



6



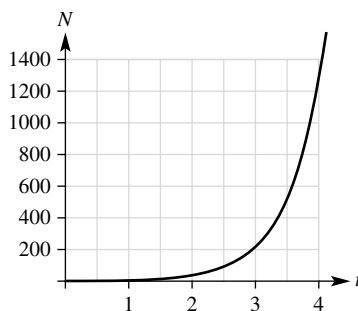
7 When the value of a changes it affects the steepness of the graph. That is, the increasing a means the y values increase or decrease.

Exercise 9B

1a

t	0	1	2	3	4
N	1	6	36	216	1296

b



c 1

d 216

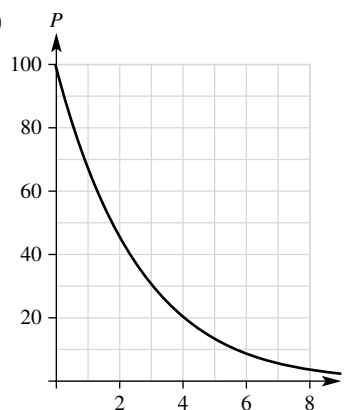
e 1260

f Approximately 3.9 days

2a

t	0	2	4	6	8
N	100	44	20	9	4

b



c 100

d 30

e 6

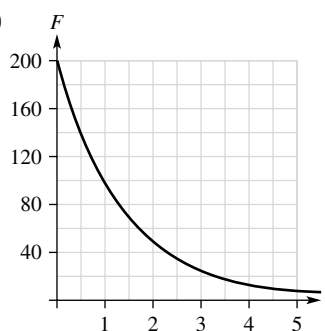
f 35

g 11

3a

t	0	1	2	3	4	5
F	200	100	50	25	13	6

b



c 200

d 140

e 25

f 6

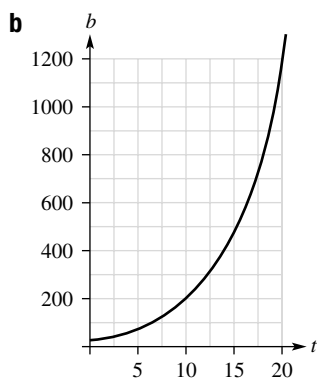
g 75

h 37

i 8

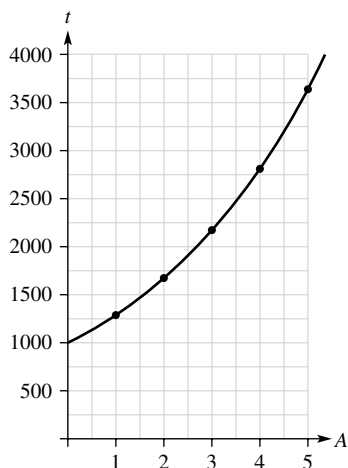
4a

t	0	5	10	15	20
b	30	75	186	462	1150



- c** 30 **d** About 60
e 130 **f** 270
g 550 **h** About 7.5 h

5ab



- c** \$1927 **d** \$6275
e 1.5 years

Exercise 9C

- 1a** $(-1, 4)$ **b** $(0, 3)$
c $(-3, 0)$ and $(1, 0)$
d $x = -1$
e 4
2a $(0, -4)$ **b** $(0, -4)$
c $(-2, 0)$ and $(2, 0)$
d $x = 0$
e -4

3a

x	-3	-2	-1	0	1	2	3
y	9	4	1	0	1	4	9

b

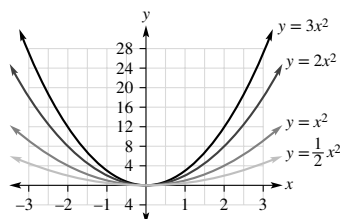
x	-3	-2	-1	0	1	2	3
y	18	8	2	0	2	8	18

c

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

d

x	-3	-2	-1	0	1	2	3
y	4.5	2	0.5	0	0.5	2	4.5



- e** $x = 0$
f Minimum
g Affects the shape of the parabola.
 A larger coefficient makes the sides of the parabola steeper.

4a

x	-3	-2	-1	0	1	2	3
y	-9	-4	-1	0	-1	-4	-9

b

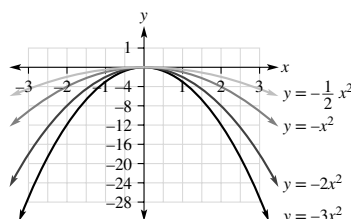
x	-3	-2	-1	0	1	2	3
y	-18	-8	-2	0	-2	-8	-18

c

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

d

x	-3	-2	-1	0	1	2	3
y	-4.5	-2	-0.5	0	-0.5	-2	-4.5



- e** $x = 0$
f Maximum
g Affects the shape of the parabola. A larger coefficient makes the sides of the parabola steeper.

5a

x	-3	-2	-1	0	1	2	3
y	10	5	2	1	2	5	10

b

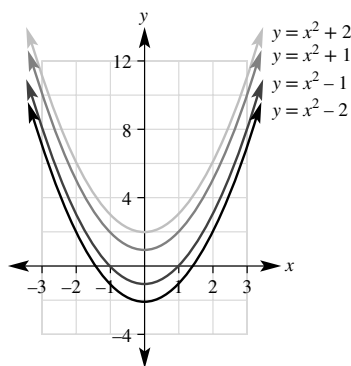
x	-3	-2	-1	0	1	2	3
y	8	3	0	-1	0	3	8

c

x	-3	-2	-1	0	1	2	3
y	11	6	3	2	3	6	11

d

x	-3	-2	-1	0	1	2	3
y	7	2	-1	-2	-1	2	7



- e** $x = 0$
f Minimum
g Adding or subtracting a number to the quadratic function $y = x^2$ moves the parabola up or down.

6a

x	-6	-4	-2	0	2	4	6
y	25	9	1	1	9	25	49

b

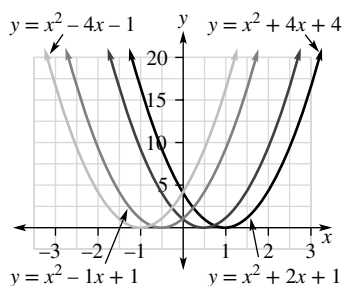
x	-6	-4	-2	0	2	4	6
y	16	4	0	4	16	36	64

c

x	-6	-4	-2	0	2	4	6
y	49	25	9	1	1	9	25

d

x	-6	-4	-2	0	2	4	6
y	64	36	16	4	0	4	16



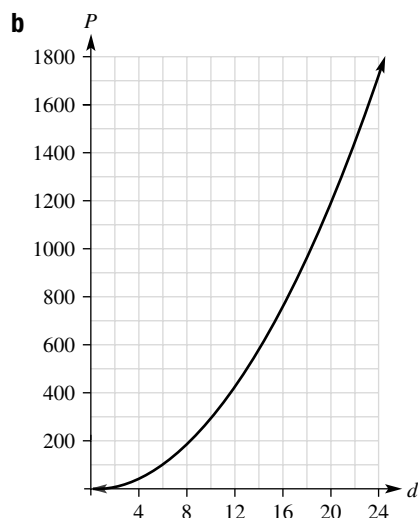
e All these graphs have a minimum turning point that touches the x -axis.

Exercise 9D

- 1a** 6 m^2 **b** 10 m^2 **c** 3.5 m **d** 12.25 m^2
2a 0 m/s **b** 11.25 m/s **c** 1.5 s **d** 2

3a

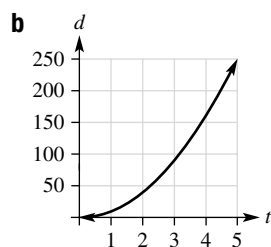
d	0	2	4	6	8	10	12	14	16	18	20	22	24
P	0	12	48	108	192	300	432	588	768	972	1200	1452	1728



- c** \$432 **d** \$1587 **e** \$1800

4a

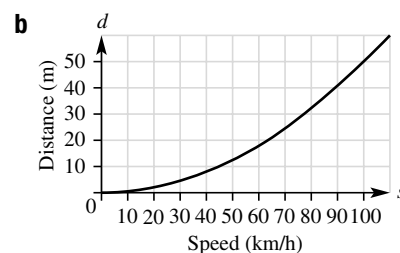
t	0	1	2	3	4	5
d	0	10	39	88	157	245



- c** 10 m **d** 245 m **e** 61 m **f** 3.2 s **g** 4.5 s

5a

s	0	20	40	50	60	80	100
d	0	2	8	12	18	32	50

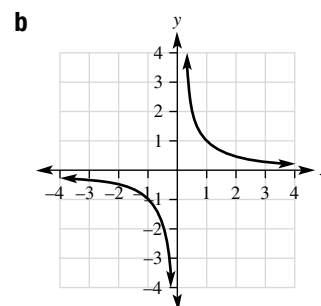


- c** $d = 2\text{ m}$
d $d = 28\text{ m}$
e About 55 km/h
f About 78 km/h
g 24 m
h 44 m

Exercise 9E

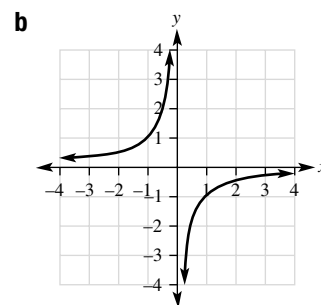
1a $y = \frac{1}{x}$

x	-4	-2	-1	$-\frac{1}{2}$	$\frac{1}{2}$	1	2	4
y	$-\frac{1}{4}$	$-\frac{1}{2}$	-1	-2	2	1	$\frac{1}{2}$	$\frac{1}{4}$



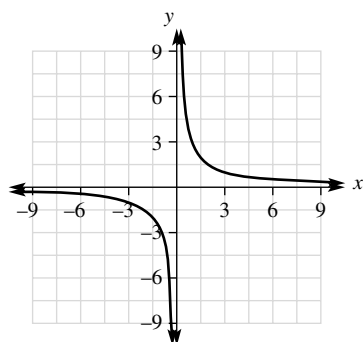
2a $y = -\frac{1}{x}$

x	-4	-2	-1	$-\frac{1}{2}$	$\frac{1}{2}$	1	2	4
y	$\frac{1}{4}$	$\frac{1}{2}$	1	2	-2	-1	$-\frac{1}{2}$	$-\frac{1}{4}$



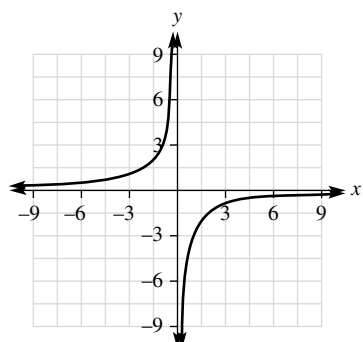
3a $y = \frac{3}{x}$

x	-9	-3	-1	$-\frac{1}{3}$	$\frac{1}{3}$	1	3	9
y	$-\frac{1}{3}$	-1	-3	-9	9	3	1	$\frac{1}{3}$



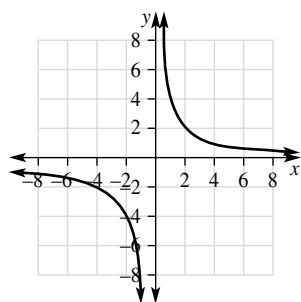
b $y = -\frac{3}{x}$

x	-9	-3	-1	$-\frac{1}{3}$	$\frac{1}{3}$	1	3	9
y	$\frac{1}{3}$	1	3	9	-9	-3	-1	$-\frac{1}{3}$



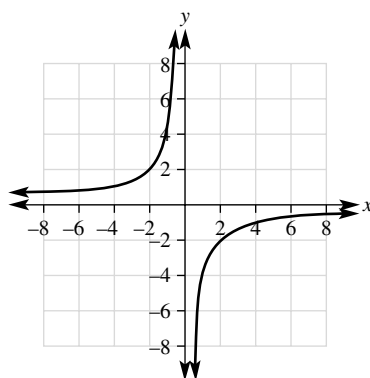
c $y = \frac{4}{x}$

x	-8	-4	-1	$-\frac{1}{2}$	$\frac{1}{2}$	1	4	8
y	$-\frac{1}{2}$	-1	-4	-8	8	4	1	$\frac{1}{2}$



d $y = -\frac{4}{x}$

x	-8	-4	-1	$-\frac{1}{2}$	$\frac{1}{2}$	1	4	8
y	$\frac{1}{2}$	1	4	8	-8	-4	-1	$-\frac{1}{2}$

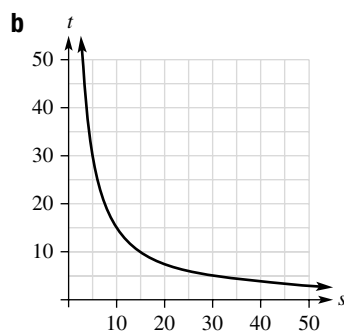


Exercise 9F

- 1a** 30h **b** 20h
c 60 km/h **d** 15 km/h
e Road trip taking 5 hours requires a speed of 300 km/h. This is not possible on Australian roads.
2a \$160 **b** \$40
c 4 **d** 1
e Yacht would have to be able to accommodate 320 people if the cost per person is \$1.

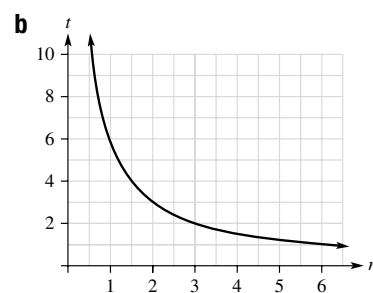
3a

s	5	10	15	25	30	50
t	30	15	10	6	5	3



4a

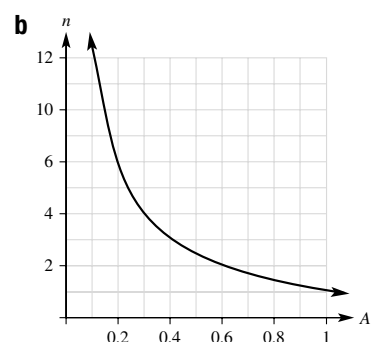
n	1	2	3	4	5	6
t	6	3	2	1.5	1.2	1



- c** 6h **d** 2h
e 1h **f** 3
g 12
h It would take 1 minute for 360 people to dig the hole. Coordinating 360 people to dig a hole in 1 minute is impractical.

5a

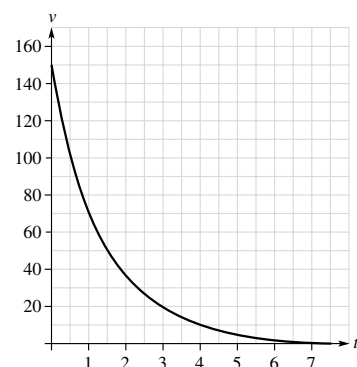
A	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.0
n	12	6	4	3	2.4	2	1.5	1.3	1.2



- c** 2400 **d** 4800
e 0.6 m^2
f About 0.25 m^2
g When 12000 attend the concert then 0.1 m^2 is allowed per person. This is insufficient room for each person.

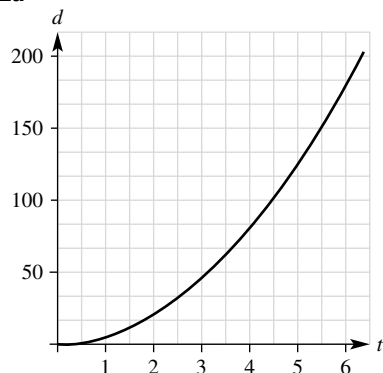
Exercise 9G

1ab



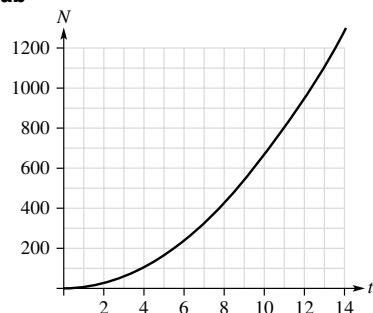
- c \$53 000 d \$27 000
 e \$13 000 f \$106 000
 g After 1 year
 h \$0.14. Equipment is worth no value after 20 years.

2a



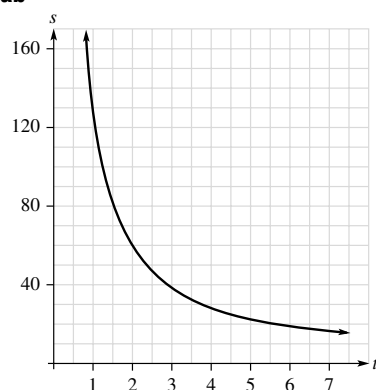
- b 11.25 m c 31.25 m
 d 61.25 m e 500 m
 f 8 s
 g Model is not appropriate for distances greater than 100 km

3ab



- c 54 d 150
 e 294 f 726
 g 20 months
 h 121.5 tadpoles. Not possible to have half a tadpole. The variable N needs to be a whole number.

4ab



- c 80 km/h
 d 48 km/h
 e 34 km/h
 f 15 km/h
 g 2.5 h
 h 240 km/h. This speed exceeds the speed limits on Australian roads.

Review 9

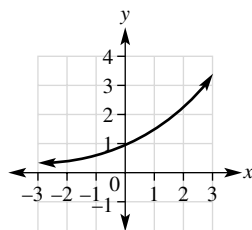
Multiple-choice

- 1 C 2 C 3 B 4 C
 5 D 6 B 7 A 8 C

Short-answer

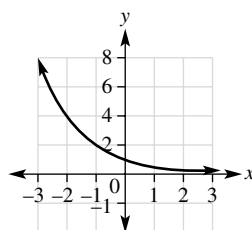
1a

x	-3	-2	-1	0	1	2	3
y	0.3	0.4	0.7	1	1.5	2.3	3.4

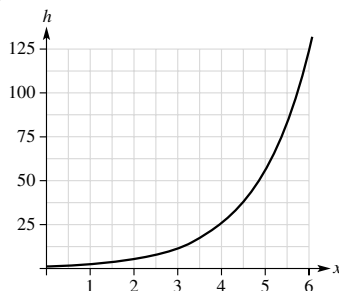


b

x	-3	-2	-1	0	1	2	3
y	8	4	2	1	0.5	0.3	0.1



2ab

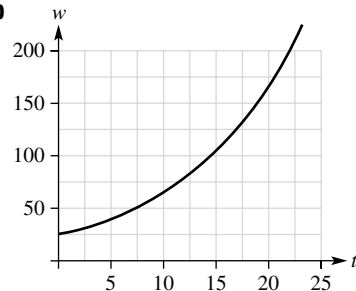


- c 3.6 cm
 d 17.4 cm

3a

t	0	5	10	15	20
w	25	40	65	104	168

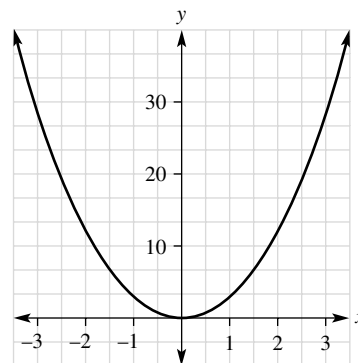
b



- c 25 earthworms
 d 33
 e About 11.5 days

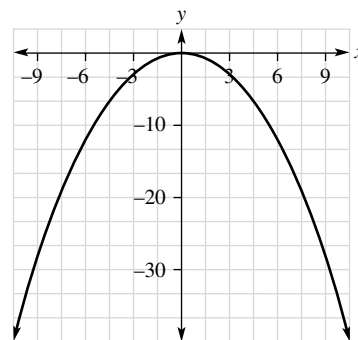
4a

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



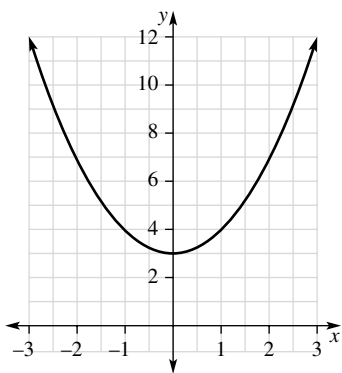
b

x	-9	-3	-1	0	1	3	9
y	-27	-3	$\frac{1}{3}$	0	$-\frac{1}{3}$	-3	-27



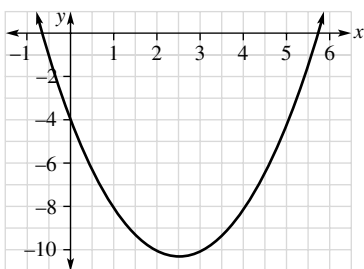
c

x	-3	-2	-1	0	1	2	3
y	12	7	4	3	4	7	12



d

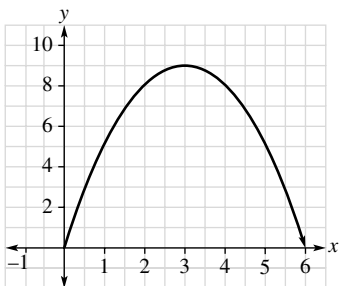
x	0	1	2	3	4	5	6
y	-4	-8	-10	-10	-8	-4	2



5a

t	0	1	2	3	4	5	6
h	0	5	8	9	8	5	0

b

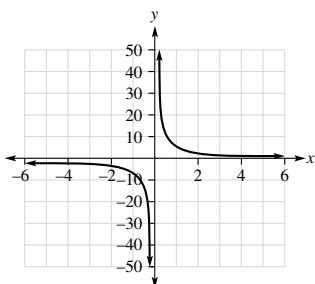


c 9m

d 3s

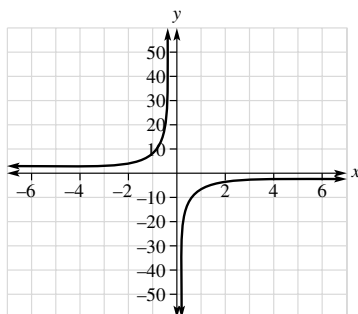
6a

x	-7	-1	$-\frac{1}{7}$	$\frac{1}{7}$	1	7
y	-1	-7	-49	49	7	1



b

x	-7	-1	$-\frac{1}{7}$	$\frac{1}{7}$	1	7
y	1	7	49	-49	-7	-1



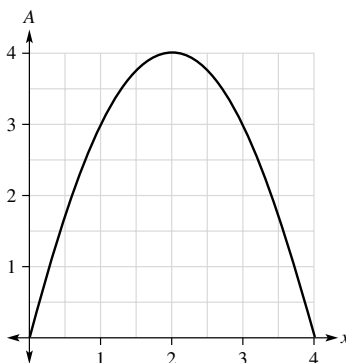
7a 80

8a $A = 4x - x^2$

b

x	0	0.5	1	1.5	2	2.5	3	3.5	4
A	0	1.8	3	3.8	4	3.8	3	1.8	0

c



d About 2.5 m²

e About 3.5 m²

f 4 m²

g 2 m

Practice paper 2

1 B 2 A 3 C 4 B 5 D

6 C 7 B 8 B 9 C 10 A

11 D 12 C 13 D 14 A 15 D

16a \$375, \$225 and \$600

b i 148 m²

ii 39%

iii 25.6 m²

iv 1536 bricks

v \$3000

c i \$21751.82

ii \$5861.82

iii \$863.87

d i 48, extrapolation

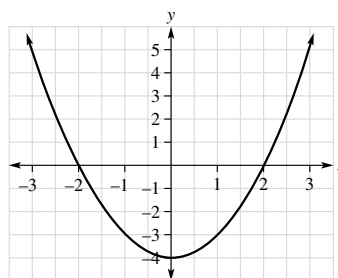
ii 66, interpolation

iii 84, extrapolation

17ai

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

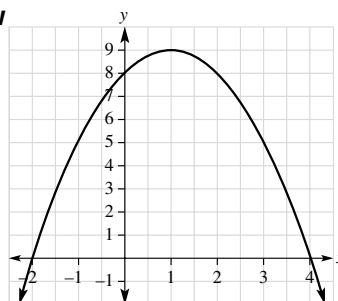
ii



iii

x	-2	-1	0	1	2	3	4
y	0	5	8	9	8	5	0

iv



b i \$35000

ii 6

iii 0.4

c Rectangle 8 cm by 5 cm drawn accurately

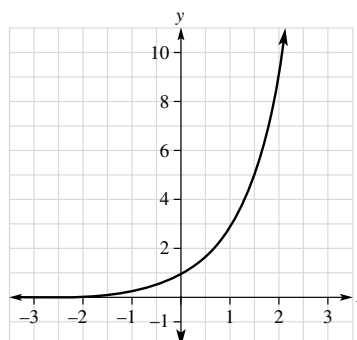
d i \$200

ii \$87.50

iii \$230

e

x	-2	-1	0	1	2
y	0.1	0.3	1	3	9

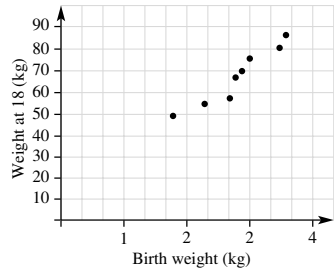




18a $\frac{2}{3}$

ii 7.5 cm

bi



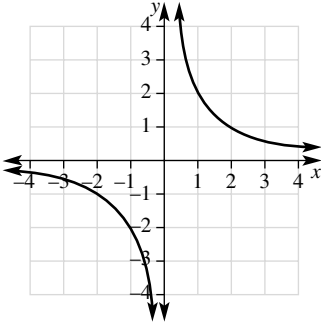
- ii Positive
- iii Moderate
- c i \$1088.40
- ii \$261216
- iii \$31680

d i $x = 0$

ii

x	-4	-2	-1	-0.5	0.5	1	2	4
y	-0.5	-1	-2	-4	4	2	1	0.5

iii



iv 4