

back cover

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**QUESTIONS**

page 21 **Exercise 1B.4**

4 b The difference between two odd functions is odd

page 28 **Exercise 1C.5**

5 in the diagram,  $\theta$  should be the angle between BC and the horizontal

page 31 **Exercise 1D**

11 should start "Recall that if  $f(x)$ ..."

page 32 **Exercise 1D**

15 e bottom line should be "... and  $\tan a = \frac{B}{A}$ ."

page 33 **Exercise 1D**

16 second line should end with "... and  $\tan a = \frac{B}{A}$ ."

page 37 **Review Set 1B**

3 should begin with "If  $\cos \theta = -\frac{2}{3}$  and ...."

page 46 **Exercise 2A.3**

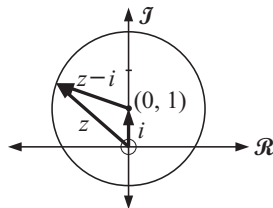
2 first line should be: "Find real numbers  $x$  and  $y$  if:"

page 50 **Exercise 2B.1**

first line of page should be:  
"Notice that  $\overline{z_1 + z_2 + z_3} = \overline{z_1 + z_2 + z_3}$ ..."

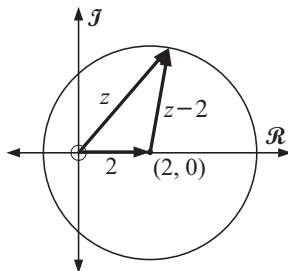
page 65 **Complex sets and their graphs**

first diagram should be:



page 66 **Example 30**

diagram should be:



page 66 **Example 31**

on the diagram, the equation of the line should be labeled as  $y = -x$

page 67 **Exercise 2E**

8 b End of question should be " $x > 2$ ", not " $x \geq 2$ "

9  $\theta$  is any angle in  $[0 \leq \theta \leq 2\pi]$

page 74 **Exercise 2G.2**

5 a The  $n$  roots of  $z^n = 1$  are  $1, w, w^2, w^3, \dots, w^{n-1}$ .

page 84 **Exercise 3B.1**

the blue box at the bottom of the page should read:

$$\frac{P(x)}{ax^2+bx+c} = Q(x) + \frac{ex+f}{ax^2+bx+c}$$

page 95 **Example 20**

the last line of the solution should read:  
 $= (x - 2)(x + \sqrt{3})(x - \sqrt{3})$

page 96 **Example 20**

the last line of the solution should read:  
 $= (x - 2)(x + \sqrt{3})(x - \sqrt{3})$

page 99

on the first diagram on the page the  $x$ -intercept should be at  $-1$

page 103 **Example 25**

question should start "Find the quartic which..."

page 107 **Exercise 3G.2**

3 the last line of the question should be: "using  $P(2 - 3i) = 0$ "

page 109 **Exercise 3H**

3 b question should start:  
"Explain why  $(3 - 2w)(3 - 2w^2) = 19$ ..."

page 112 **Example 32**

a last line should read " $|z_4| = 0.4072$ "

page 113 **Example 32**

b last line should read " $|z_4| = 9.866$ "  
c last line should read " $|z_4| = 25.9044$ "

page 115 **Example 33**

b second line should read " $[2 \operatorname{cis}(-\frac{\pi}{6})]^2 = 4 \operatorname{cis}(-\frac{\pi}{3})$ "

page 116 **Exercise 3J.2**

5 d last line of question should be " $n = 0, 1, 2, 3, 4, 5$  or  $6$ "

page 120 **Example 36**

a last line should be:  
" $\therefore c = \frac{1}{2} + \frac{1}{2}i$  is not a member of the Mandelbrot set."  
b last line should be:  
" $\therefore c = -1.940799807$  is a member of the Mandelbrot set..."

page 136 **Example 10**

the end of the first line of the question should be "Find  $x$  if:"

page 143

text in blue highlight box at bottom of page should be:

**projection vector of  $\mathbf{a}$  on  $\mathbf{b}$**  is  $\left(\frac{\mathbf{a} \bullet \mathbf{b}}{|\mathbf{b}|}\right) \frac{\mathbf{b}}{|\mathbf{b}|}$   
where  $\frac{|\mathbf{a} \bullet \mathbf{b}|}{|\mathbf{b}|}$  is the length of the projection vector  
and  $\frac{\mathbf{b}}{|\mathbf{b}|}$  is the unit vector in the direction of  $\mathbf{b}$

page 144

the proof at the top of the page should be as follows:

$$\begin{aligned} \text{In triangle PQR, } \cos \theta &= \frac{PQ}{PR} = \frac{PQ}{|\mathbf{a}|} \\ \therefore PQ &= |\mathbf{a}| \cos \theta \\ \therefore PQ &= \frac{|\mathbf{a}| |\mathbf{b}| \cos \theta}{|\mathbf{b}|} \\ \therefore PQ &= \frac{\mathbf{a} \bullet \mathbf{b}}{|\mathbf{b}|} \end{aligned}$$

However, the angle  $\theta$  between vectors  $\mathbf{a}$  and  $\mathbf{b}$  may be acute or obtuse.

Now if  $\theta$  is acute (as in the triangle), then  $\cos \theta$  is positive, and  $PQ = \frac{\mathbf{a} \bullet \mathbf{b}}{|\mathbf{b}|} > 0$  as given above.

But if  $\theta$  is obtuse then  $\cos \theta$  is negative, and so  $\mathbf{a} \bullet \mathbf{b}$  is negative. In this case, the length  $PQ = \frac{\mathbf{a} \bullet \mathbf{b}}{|\mathbf{b}|} > 0$

$\therefore$  a general formula for the length of PQ is  $PQ = \frac{|\mathbf{a} \bullet \mathbf{b}|}{|\mathbf{b}|}$ , and this is the length of the projection vector of  $\mathbf{a}$  on  $\mathbf{b}$ .

Now  $\frac{\mathbf{b}}{|\mathbf{b}|}$  is a unit vector in the direction of  $\mathbf{b}$ .

If  $\theta$  is acute, the projection vector is in the same direction as  $\mathbf{b}$ , and the coefficient of  $\mathbf{b}$  in the projection vector is positive.

$\therefore$  the projection vector of  $\mathbf{a}$  on  $\mathbf{b}$  is

$$PQ \times \frac{\mathbf{b}}{|\mathbf{b}|} = \frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{b}|} \frac{\mathbf{b}}{|\mathbf{b}|} \quad \text{since } \mathbf{a} \cdot \mathbf{b} > 0 \text{ for all acute } \theta$$

But if  $\theta$  is obtuse, the projection vector is in the opposite direction to  $\mathbf{b}$ , and the coefficient of  $\mathbf{b}$  in the projection vector is negative.

$\therefore$  the projection vector of  $\mathbf{a}$  on  $\mathbf{b}$  is

$$-PQ \times \frac{\mathbf{b}}{|\mathbf{b}|} = -\frac{|\mathbf{a} \cdot \mathbf{b}|}{|\mathbf{b}|} \frac{\mathbf{b}}{|\mathbf{b}|} = \frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{b}|} \frac{\mathbf{b}}{|\mathbf{b}|} \quad \text{since } \mathbf{a} \cdot \mathbf{b} < 0 \text{ for obtuse } \theta.$$

Hence the projection vector of  $\mathbf{a}$  on  $\mathbf{b}$  is always  $\frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{b}|} \frac{\mathbf{b}}{|\mathbf{b}|}$ .

page 144 **Example 17**

c the projection vector of  $\mathbf{b}$  on  $\mathbf{a} = \left( \frac{\mathbf{b} \cdot \mathbf{a}}{|\mathbf{a}|} \right) \frac{\mathbf{a}}{|\mathbf{a}|}$

page 153 **Exercise 4G.2**

5 c question should read:

“prove that  $\mathbf{a} + \mathbf{b} = k\mathbf{c}$  for some scalar  $k$ ”

page 167 **Exercise 4J**

14 Equation of plane in diagram and question should be:

$$“Ax + By + Cz + D = 0”$$

page 176

under the section dealing with midpoints the third line of the proof should be “ $= a + \frac{1}{2}(-\vec{OA} + \vec{OB})$ ”

page 182 **Exercise 5A.3**

1 In the diagram, vector  $\mathbf{a}$  should go from O to A.

page 192 **Exercise 5B.1**

1 e XY is parallel to TZ

page 203 **Review Set 5B**

4 On the diagram the point O should be labelled D.

page 214 **Example 3**

c second line of solution is missing. it should be:

$$\therefore \text{range} = x(5.954) - x(0) = 150.85 - 2 = 148.85 \text{ m}$$

page 215 **Exercise 6C.1**

1 c question should be: “How far from the line at  $x = 0$  is the tip of the javelin when it is released?”

page 217

First paragraph after *step 3* should be:

“As  $t$  takes all values...”

The Bézier curves demo on the student CD produces incorrect results. A corrected version of this demo can be downloaded from our website ([www.haeseandharris.com.au](http://www.haeseandharris.com.au)).

page 223 **Exercise 6D**

5 a should be “Find the initial position of P.”

c should start “Explain why  $|\mathbf{v}| = R\omega$  ...”

page 227

$\frac{dy}{dt}$  is the rate at which B moves upwards.

page 232 **Exercise 6F**

10 third line of the problem should state:

“Michael starts walking westwards from B at  $3 \text{ ms}^{-1}$ ”

page 232 **Review Set 6A**

1 b the speed of P is constant at  $\sqrt{13} \text{ cm/s}$  Find  $a$ .

page 234 **Review Set 6C**

6 third line of problem should end:

“3 seconds after A passes through X.”

page 237

third line from bottom of page should be:

$$“= \sin x(0) + \cos x(1) \quad \{ \text{as } h \rightarrow 0, \cos h \rightarrow 1, \frac{\sin h}{h} \rightarrow 1 \}”$$

page 250 **Exercise 7C**

8 the flywheel rotates in a clockwise direction

page 258

the integral in both highlighted boxes should be  $\int_a^b$

page 264 **Review Set 7A**

7 AM and BM are 1 km, not AP and BP.

page 267 **Review Set 7D**

7 a Equation should be:

$$E(\theta) = \frac{dj_1}{\cos \theta} + (l - d \tan \theta)j_2, j_1 > j_2$$

page 281

highlighted box should be:

“if  $\frac{dy}{dx} = f(x)$  then  $y = \int f(x)dx$ ”

page 293 **Exercise 8E.1**

7 the question should begin:

“A body moves to the right...”

page 294 **Example 18**

the worked solution should begin:

$$q = -2\pi kr \frac{dT}{dr}$$

$$\therefore 680 = -2\pi(0.2)r \frac{dT}{dr}$$

$$\therefore \frac{1}{r} = \frac{-0.4\pi}{680} \frac{dT}{dr}$$

$$\therefore \int \frac{1}{r} dr = \int \frac{-0.4\pi}{680} \frac{dT}{dr} dr$$

$$\therefore \int \frac{1}{r} dr = \int -\frac{0.4\pi}{680} dT$$

$$\therefore \int \frac{1}{r} dr = -0.001848 \int 1 dT$$

page 297 **Example 20**

the second line onwards, from the top of the page should read:

$$\therefore \frac{v-29.4}{29.4} = -e^{-\frac{t}{3}} \quad (\text{since } v(0) = 0)$$

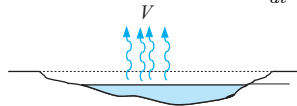
$$\therefore v - 29.4 = -29.4e^{-\frac{t}{3}}$$

page 297 **Exercise 8E.2**

6 the third line of the question should be:

“The equation for the motion is  $\frac{dv}{dt} = g - 4v$ ...”

7 a question should read: “Explaining the symbols used, why is the differential equation  $\frac{dV}{dt} = k(V_0 - V)$  appropriate?”



page 309 **Review Set 8A**

1 a question should end:

“... the differential equation  $\frac{d^2y}{dt^2} = -4(y - 3)$ .”

page 312 **Review Set 8D**

3 last line should end:

$$“...(y - 2)^2 = e^x(y - 3).”$$

page 316 **Opening Problem**

in the diagram, the + and - signs are the wrong way round and the second paragraph should begin:

The extension  $s$ , will be positive...

page 317 **Investigation 1**

1 equation should be: “ $y = \cos(4\pi x)$ ”

3 equation should be: “ $y = \cos(4\pi x)e^{-x}$ ”

page 317 Investigation 1

in the diagram, the + and - signs are the wrong way round

page 333 Investigation 6

the first equation should be:

" $s(t) = s_0 e^{-\alpha t} \cos(\beta t)$ "

page 337-338 Investigation 7

equation for  $S'$  should be:  $S' = -\alpha S + D + 320$

What to do:

- By differentiating (2) and using (1), show that a second order DE for the supply function is

$$S'' + \alpha S' + S = 320 \quad \dots (3)$$

- Write down and solve the characteristic equation corresponding to the second order DE

$$S'' + \alpha S' + S = 0 \quad \dots (4)$$

- Hence write down the general solution to (4) if:

i  $\alpha = 1.8$       ii  $\alpha = 2.0$       iii  $\alpha = 2.2$

- Show that if  $y_0(t)$  satisfies  $y'' + ay' + by = 0$  then  $y_1(t) = y_0(t) + c$  satisfies  $y'' + ay' + by = bc$ .

Hence write down a general solution to (3) for each case:

i  $\alpha = 1.8$       ii  $\alpha = 2.0$       iii  $\alpha = 2.2$

By considering the forms of the solutions obtained, predict which value of  $\alpha$  is desired by Muhlack and Dangerfield.

- Show that as  $t \rightarrow \infty$ ,  $S(t) \rightarrow 320$  for each of the general solutions obtained in 4. Explain why this is not surprising.

- For your chosen value of  $\alpha$ :

- Use  $S(0) = 0$  to evaluate one of the unknown constants.
- Use (2) evaluated at  $t = 0$  to deduce the remaining coefficient.
- Write down a particular solution for  $S(t)$ .
- Use (2) to obtain a particular solution for  $D(t)$ .
- Graph  $S(t)$  and  $D(t)$  on the same set of axes, and hence check your prediction in 4.

- If the rate of change of gnome supply was  $S' = -\alpha S + \beta D + k$ , where  $\beta > 0$ ,  $k$  a constant, what would the desired coefficient  $\alpha$  be?

Show that  $\beta$  must equal  $\alpha - 1$  for supply to match demand at equilibrium. **Hint:** When does  $S' = D' = 0$ ?

page 341 Investigation 9

- second equation should be:

" $y' = -\frac{1}{10}y \left(1 - \frac{3y}{10000} - \frac{x}{50000}\right)$ "

page 343 Review Set 9A

- spring constant should be:  $k = 2.16$

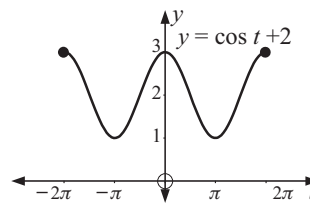
ANSWERS

page 346 Exercise 1C.1

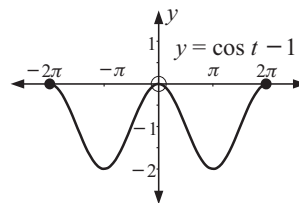
- Graphs should have solid circles on their end points at  $x = 0$  and  $x = 4\pi$ .

page 347 Exercise 1C.3

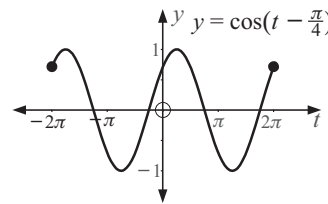
1 a



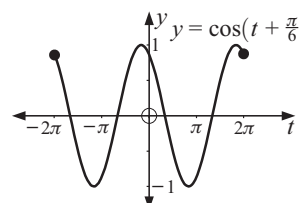
b



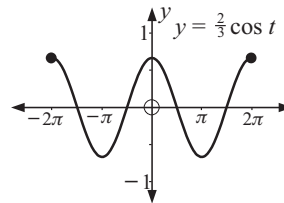
c



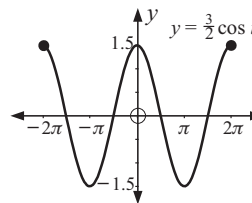
d



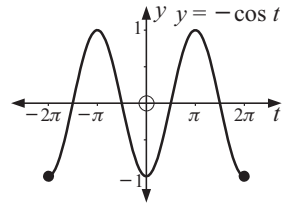
e



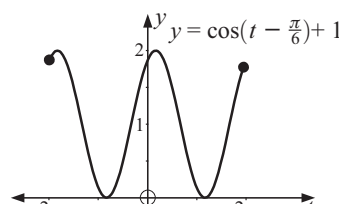
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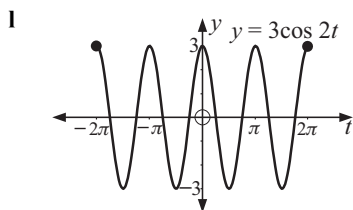
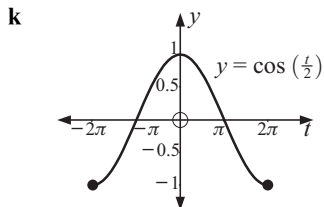
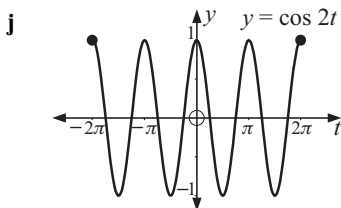
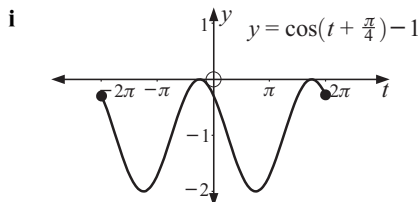


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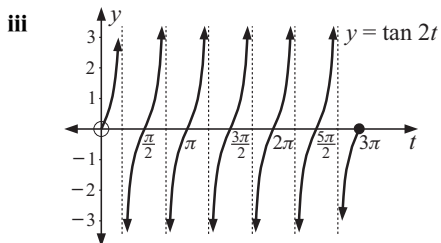
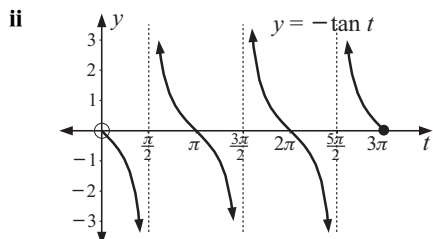
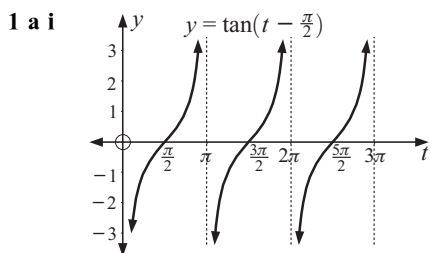


h





page 348 **Exercise 1C.4**



page 348 **Exercise 1E.1**

- 1 d** 5th number should be 6.3648.  
**h** 0.2607, 1.8337, 6.5438

page 349 **Exercise 1E.2**

- 2 c**  $0, \frac{2\pi}{3}, \frac{4\pi}{3} \pm k2\pi$   
**d**  $\frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6} \pm k2\pi$   
**e** 11:15 am

page 349 **Review Set 1A**

- 8 a** all except  $x = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

page 352 **Exercise 2C.3**

- 11 b** 0 if  $a \neq 1$ , undefined if  $a = 1$

page 352 **Exercise 2D.3**

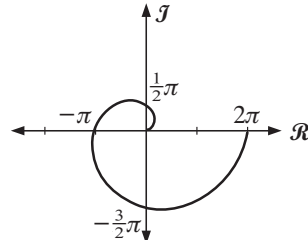
- 3 a**  $|z - 1| = 2 \sin \frac{\phi}{2}$ ,  $\arg(z - 1) = \frac{\phi}{2} + \frac{\pi}{2}$   
**b**  $z - 1 = (2 \sin \frac{\phi}{2}) \text{cis}(\frac{\phi}{2} + \frac{\pi}{2})$   
**c**  $\overline{z - 1} = (2 \sin \frac{\phi}{2}) \text{cis}(-\frac{\phi}{2} - \frac{\pi}{2})$

page 352 **Exercise 2D.4**

- 4 a**  $a(x^2 + 2x + 4) = 0, a \neq 0$   
**b**  $a(x^2 - 2x + 2) = 0, a \neq 0$

page 354 **Exercise 2E**

- 9**  $r = \theta, 0 \leq \theta \leq 2\pi$



page 355 **Exercise 2G.2**

- 1 a iii**  $z = \frac{1-w^n}{2}$ , where  $n = 0, 1, 2$  and  $w = \text{cis} \frac{2\pi}{3}$   
**4 c**  $1 - w^5$

page 357 **Exercise 3C**

- 5 b**  $P(z) = a(z + 2)(z^2 + 1) \quad a \neq 0$

page 359 **Exercise 3J.2**

- 5 b** 3 cycle  
**c** 3 cycle

page 359 **Exercise 3J.3**

- 1 a ii**  $0 \leftrightarrow -1$  is the 2-cycle  
**b i**  $\frac{1}{2} \pm \frac{\sqrt{33}}{6}$

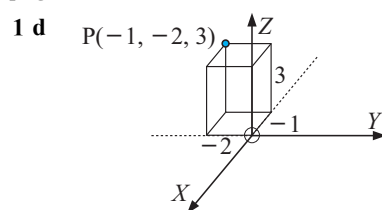
page 359 **Exercise 3J.4**

- 1**  $(-1, 0)$

page 359 **Review Set 3A**

- 4**  $a = 7, b = 0$  or  $a = 4, b = \pm\sqrt{3}$

page 361 **Exercise 4A**



page 362 **Exercise 4B**

- 2 a**  $\vec{AB} = [4, -1, -3] \quad \vec{BA} = [-4, 1, 3]$

page 363 **Exercise 4F**

- 9 c**  $[\frac{1}{3}, \frac{1}{3}, \frac{1}{3}]$   
**20** -7

page 363 **Exercise 4H**

- 4 a** 4 units<sup>3</sup>  
**5 c** 9 units<sup>3</sup>

page 364 **Exercise 4I**

- 9 a**  $\mathbf{a} = [2, 3, 6], \mathbf{b} = [1, 1, 1]$

page 364 **Exercise 4K**

1 b i  $a_1 = a_2, b_1 = b_2, c_1 = c_2$

page 365 **Review Set 4A**

1 c  $\frac{5}{14}[-1, 2, 3]$

page 365 **Review Set 4C**

2 a 3 units

page 366 **Exercise 5A.3**

5  $\vec{ON} = \frac{4}{5}\mathbf{a} - \frac{3}{5}\mathbf{b}$

page 366 **Exercise 5B.2**

- 1 a yes {opposite angles are supplementary}  
 b yes {one side subtends equal angles at the other two vertices}  
 c no {opposite angles are not supplementary}  
 d yes {opposite angles are supplementary}  
 e yes {one side subtends equal angles at the other two vertices}  
 f yes {opposite angles are supplementary}

page 367 **Exercise 6A.1**

1 c  $v'(t) \doteq 5.6952t^{0.0865}$

page 367 **Exercise 6B**

2 d  $t = 4.2$  hours

page 367 **Exercise 6C.1**

- 4 b  $[3, 3], 3\sqrt{2} \text{ cms}^{-1}$   
 e  $\sqrt{26} \text{ cms}^{-1}$   
 f maximum speed  $9\sqrt{2} \text{ cms}^{-1}$ , minimum speed  $4.025 \text{ cms}^{-1}$

page 368 **Exercise 6C.2**

3 c left-most  $(-2.552, 1.709)$ , right-most  $(1, 2)$

page 368 **Exercise 6C.3**

2 a  $X(s) = (1 - 3s)x_0 + 3x_1s, Y(s) = (1 - 3s)y_0 + 3y_1s$

page 368 **Exercise 6D**

- 3 c arc length  $l$  from  $(R, 0) = R(\phi + t) \dots$   
 5 b  $\mathbf{v} = k[-R\sin(\omega t + \phi), R\cos(\omega t + \phi)]$

page 368 **Exercise 6E.1**

1 g  $(x - 1)(2 - y) = 6$

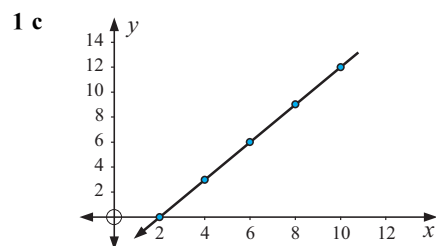
page 368 **Exercise 6E.2**

2 b  $7x - 2y = 78$

page 368 **Exercise 6F**

- 2 a moving to the right at 1 unit per second  
 2 b moving to the right at 10000 units per second

page 369 **Review Set 6A**



- 2 a  $y = \frac{1}{9}(x^2 - 9x + 18)$  for  $x \geq 3$   
 b  $(3, 0)$

page 369 **Review Set 6B**

- 2 b  $(-15, 7)$  and  $(-3, 1)$   
 6 a  $V(r) = \frac{1}{3}\pi r^2 \left(\frac{8r}{3}\right) = \frac{8\pi}{9}r^3$   
 b  $\frac{dr}{dt} = -\frac{8}{375\pi}$  m per minute

page 369 **Review Set 6C**

- 1 a X23  $x_1 = 2 + t, y_1 = 4 - 3t, t \geq 0$   
 b Y18  $x_2 = 11 - (t - 2), y_2 = 3 + a(t - 2), t \geq 2$   
 c intercept occurred at 2:22:30 pm  
 d  $\theta = 77.28^\circ, 4.540$  km per minute  
 4 a  $X(t) = -1.125 - 1.25t, Y(t) = -2 + 5t$   
 b ii  $k = -22.5$   
 6  $3.601 \text{ ms}^{-1}$

page 369 **Exercise 7A.1**

- 7 a rising  
 b rising at 2.731 m per hour  
 8 a  $-3400\pi$  units per second

page 371 **Exercise 7C**

8 b  $100\pi$  radians per second

page 371 **Exercise 7D.2**

7 c  $-\ln|\cos x| + c$

page 372 **Exercise 7D.5**

2  $6.283 \text{ units}^2$

page 372 **Review Set 7C**

7 c increasing at 0.05 units per second

page 372 **Review Set 7D**

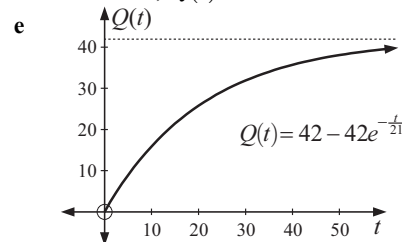
1 b  $\frac{dy}{dx} = \frac{-y \cos x}{\sin x + 2y}$

page 373 **Exercise 8A.1**

- 1 a  $P_0 = 10^6$   
 b i  $2P_0 = 2 \times 10^6$   
 b ii  $4P_0 = 4 \times 10^6$   
 b iii  $64P_0 = 6.4 \times 10^7$

page 373 **Exercise 8A.2**

- 1 c as  $t \rightarrow \infty, S \rightarrow 36.31$  gms  
 3 a  $3\frac{dQ}{dt} + \frac{Q}{7} = 6$   
 b  $k = -\frac{1}{21}, c = 42$   
 c  $a = -42$   
 d as  $t \rightarrow \infty, Q(t) \rightarrow 42$  coulombs



f 21.62 seconds

page 374 **Exercise 8D.1**

- 2 c  $t = 6y^{\frac{1}{2}} + 26$   
 4 a  $p = \frac{10}{e}$

page 374 **Exercise 8D.2**

- 3  $y = e^{-x^2}$   
 5  $y^2 = x^2 - 9, a = \pm 3\sqrt{2}$

page 374 **Exercise 8E.1**

3 \$1537.41, < 847 plates

page 374 **Exercise 8E.2**

- 1 a  $399.8^\circ\text{C}$   
 b  $0.3867\text{ m}$   
 c  $0.1867\text{ m}$   
 10 a  $I = 2 + Ae^{-\frac{100}{3}t}$   
 b  $I = 2 \left(1 - e^{-\frac{100}{3}t}\right)$

page 374 **Exercise 8F**

- 1 d i 41 years  
 3 c  $t \doteq 6.089 \times 10^{-5}$

page 375 **Review Set 8A**

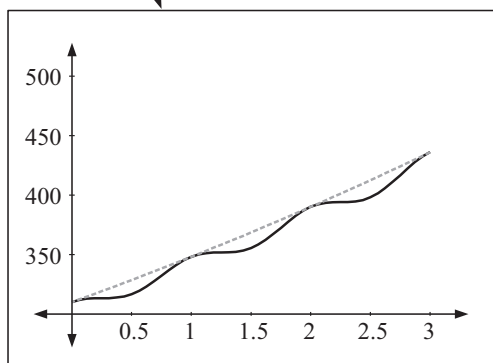
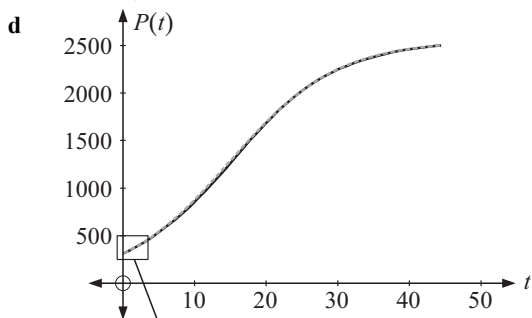
- 5  $y^2 = 20 - 4e^x$   
 7 c  $t \doteq 2.057\text{ years}$

page 375 **Review Set 8B**

- 3 b  $0.02479\text{ m}$   
 4 a  $\frac{dN}{dt} = kN$   
 6 a  $y = 1 - \frac{2}{x^2 + 4x + 1}$   
 b vertical asymptotes  $x = -2 \pm \sqrt{3}$

page 375 **Review Set 8D**

- 5 a  $P(t) = \frac{2550}{1 + 7.226e^{-0.1330t}}$   
 b  $t = 14.87\text{ years}$   
 c  $P = \frac{2550}{1 + 7.380e^{-0.1330t - 0.02116 \cos 2\pi t}}$



The student's initial model predicts the long term population behaviour just as well as the modified model (seen from the graph with  $0 \leq t \leq 50$ ). However, (as seen from the graph with  $0 \leq t \leq 5$ ) the modified model accounts for the small scale detail of seasonal fluctuations that the initial model lacks.

page 375 **Exercise 9A.3**

- 5  $I(t) = Ip \cos\left(t + \frac{3\pi}{2}\right)$   
 $V(t) = 2Ip \sin\left(t + \frac{3\pi}{2}\right)$

page 375 **Exercise 9B.1**

- 2 a line 2 should be "if  $w \neq 0$ ,  $y = Ae^{wt} + Be^{-wt}$ "

page 375 **Exercise 9B.2**

- 1 a  $y(t) = 3e^{2t} + 4e^{-t}$   
 2 b  $y(t) = 4 - 3e^{3t}$

page 376 **Exercise 9C.2**

- 4 b i  $\alpha = \beta = 0 : x(t) = A + Bt$   
 $\alpha = \beta \neq 0 : x(t) = A \cos \alpha t + B \sin \alpha t$   
 4 b ii  $\alpha = 0$  or  $\beta = 0 : x(t) = A + Bt$   
 $\alpha \neq 0$  and  $\beta \neq 0 : x(t) = A \cos t\sqrt{\alpha\beta} + B \sin t\sqrt{\alpha\beta}$

page 376 **Exercise 9C.3**

- 6 second line should be:  
 $y(t) = e^{-t}(2 \cos 3t - 2 \sin 3t)$

page 376 **Review Set 9B**

- 4 b i when  $\alpha\delta - \gamma\beta < 0$   
 ii when  $\alpha\delta - \alpha\beta > 0$   
 7 second line of solution should be:  
 $v(t) = 4 \cos 0.9t - 2.7 \sin 0.9t$   
 8 a  $A(t) = \frac{720}{17} - \frac{380}{17}e^{-1.7t}$   
 $B(t) = \frac{380}{17}e^{-1.7t} + \frac{640}{17}$