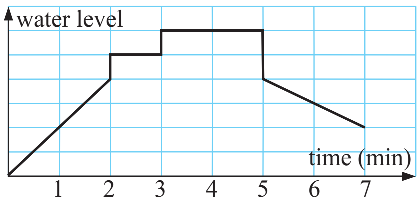
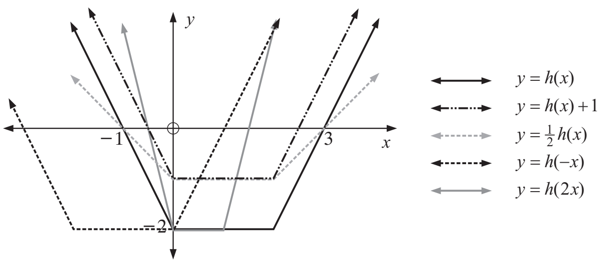
page 35 **Review Set 1A**

1



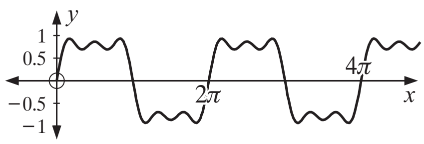
page 111 **Exercise 6D**

6

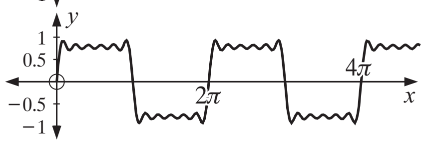


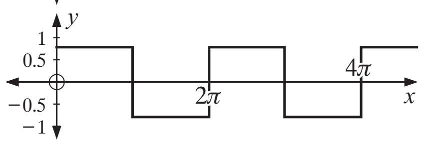
page 225 **Exercise 13D.1**

6 a



b





page 227 **Exercise 13E**

2 a Solution should finish:

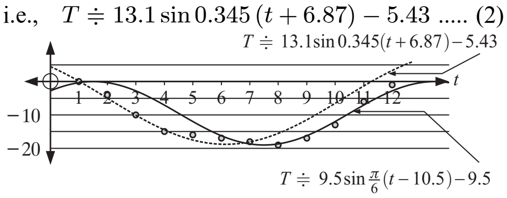
At min., $t = 7$, and at max., $t = 2 + 12 = 14$
$\therefore \quad C = \frac{7+14}{2} = 10.5$
So, $\quad T \doteqdot 4.5 \sin \frac{\pi}{6}(t - 10.5) + 11.5$

b Last line should be:

(2) $\frac{\pi}{6}(1.44 - (-10.5)) \doteqdot 6.25 \doteqdot 2\pi$

3 Solution should finish:

At min., $t = 8$, and at max., $t = 1 + 12 = 13$
$\therefore \quad C = \frac{8+13}{2} = 10.5$
So, $\quad T \doteqdot 9.5 \sin \frac{\pi}{6}(t - 10.5) - 9.5$ ..... (1)
From technology, $\quad T \doteqdot 13.1 \sin(0.345t + 2.37) - 5.43$
i.e., $\quad T \doteqdot 13.1 \sin 0.345(t + 6.87) - 5.43$ ..... (2)



The model does not seem appropriate.

page 228 **Exercise 13E**

5 a Second line should be:

period $= \frac{2\pi}{B} = 2 \times 12.4$ hours $\quad \therefore \quad B = \frac{2\pi}{24.8} \doteqdot 0.253$

Last two lines should be:

So, $\quad H \doteqdot 7 \sin 0.253(t - 6.2) + 0$
i.e., $\quad H \doteqdot 7 \sin 0.253(t - 6.2)$

page 248 **Review set 13C**

3 Solution should finish:

$C = \frac{7+14}{2} = 10.5 \quad$ {values of t at min. and max.}
So, $\quad T \doteqdot 7.05 \sin \frac{\pi}{6}(t - 10.5) + 24.75$
From technology, $\quad T \doteqdot 7.21 \sin(0.488t + 1.082) + 24.75$
i.e., $\quad T \doteqdot 7.21 \sin 0.488(t + 2.22) + 24.75$
Note: $\quad 0.488(2.22 - -10.5) \doteqdot 6.21 \doteqdot 2\pi$

page 259 **Exercise 14E.2**

5 b Solution should finish:

$$= \begin{bmatrix} 78\,669.5 \\ 65\,589 \end{bmatrix} \begin{matrix} \text{income from day 1} \\ \text{income from day 2} \end{matrix}$$

page 325 **Exercise 17A**

3 b Current solution should be part of part **a**.

Solution should be:

If $(k, 4)$ lies on $x = 1 - 2t, \; y = 1 + t$
then $k = 1 - 2t$ and $4 = 1 + t$
$\therefore \quad t = 3$ and $k = 1 - 6 = -5$, i.e., $k = -5$.

page 326 **Exercise 17C**

2 b Question should finish:

$\therefore \quad \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -2 \\ 6 \end{bmatrix} + \frac{t}{10} \begin{bmatrix} 20 \\ 15 \end{bmatrix}$

page 328 **Exercise 17D**

3 a $\begin{bmatrix} -3 \\ 4 \end{bmatrix}$ has length $\sqrt{(-3)^2 + 4^2} = 5$

$\therefore$ unit direction vector is $\frac{1}{5}\begin{bmatrix} -3 \\ 4 \end{bmatrix}$

$\therefore$ the velocity vector is $\frac{1}{5}\begin{bmatrix} -3 \\ 4 \end{bmatrix} \times 10 = \begin{bmatrix} -6 \\ 8 \end{bmatrix} = -6\mathbf{i} + 8\mathbf{j}$

page 353 **Exercise 18B.3**

3 b i Table should be:

Group	*Tally*	*midpt* (x)	*freq* (f)	$f\,x$
0 - 4	𝍸	2	5	10
5 - 9	𝍸 ||||	7	9	63
10 - 14	𝍸 𝍸 ||||	12	14	168
15 - 19	𝍸 𝍸 |||	17	13	221
20 - 24	𝍸 |	22	6	132
25 - 29	|||	27	3	81
		$\sum$	50	675

Approx. mean
$= \frac{675}{50}$
$= 13.5$ goals

page 376 **Exercise 19E.2**

3 b P(does not contain captain or vice captain)
$= $ P(OOO)
$= \frac{5}{7} \times \frac{4}{6} \times \frac{3}{5}$
$= \frac{60}{210}$
$= \frac{2}{7}$

$\therefore$ P (does contain captain or vice captain)
$= 1 - \frac{2}{7}$
$= \frac{5}{7}$

page 395 **Exercise 20B.1**

2 a Originally (when $x = 0$) the volume was 8200 L

b After 1 hour $(x = 1)$ the volume was 3000 L.

c The tangent at (0, 8.2) passes through (1, 0)

$$\therefore \text{ slope of tangent } = \frac{(8.2 - 0) \text{ kL}}{(0 - 1) \text{ h}} = -8.2 \text{ kL/h}$$

i.e., loses 8200 L/hour

d After 1 hour, $x = 1$ and the tangent at (1, 3) passes through (0, 6)

$$\therefore \text{ slope of tangent } = \frac{(6 - 3) \text{ kL}}{(0 - 1) \text{ h}} = -3 \text{ kL/h}$$

i.e., the rate of loss is 3000 L/hour

page 417 **Exercise 21F.1**

2 d Second to last line should read:

$$\therefore \frac{dy}{dx} = 3x^2\sqrt{5 - x^2} - \frac{x^4}{\sqrt{5-x^2}}$$

page 423 **Exercise 21G**

3 d Last four lines should be:

When $x = 0$, $y = 1 - 0 + 0 - 0 = 1$

and when $x = 1$, $y = 1 - 3 + 12 - 8 = 2$

$\therefore$ the tangents are $\dfrac{y-1}{x-0} = -3$ and $\dfrac{y-2}{x-1} = -3$

i.e., $y = -3x + 1$

and $y = -3x + 5$

page 428 **Exercise 21G**

8 c Solution should be:

$y = x^2 - \dfrac{3}{x}$ at $x = 3$

Since when $x = 3$, $y = 3^2 - \frac{3}{3} = 8$,

the point of contact is (3, 8)

Now $\dfrac{dy}{dx} = 2x + \dfrac{3}{x^2}$

$\therefore$ at $x = 3$, $\dfrac{dy}{dx} = 2(3) + \dfrac{3}{3^2} = 6 + \frac{1}{3} = \frac{19}{3}$

$\therefore$ tangent at (3, 8) has slope $\frac{19}{3}$ and therefore its equation is

$\dfrac{y-8}{x-3} = \frac{19}{3}$ i.e., $3(y - 8) = 19(x - 3)$

$3y = 19x - 33$

i.e., $y = \frac{19}{3}x - 11$

Now the tangent meets the curve where

$\frac{19}{3}x - 11 = x^2 - \dfrac{3}{x}$

$\therefore 19x^2 - 33x = 3x^3 - 9$

i.e., $3x^3 - 19x^2 + 33x - 9 = 0$

Because the tangent touches the curve at $x = 3$,

there must be a repeated solution at this point.

Hence, $3x^3 - 19x^2 + 33x - 9 = (x - 3)^2(3x - 1) = 0$

$\{$since coefficient of x^3 is 3 and constant term is $-9\}$

$\therefore$ the tangent meets the curve again at $x = \frac{1}{3}$

where $y = \left(\frac{1}{3}\right)^2 - \dfrac{3}{\left(\frac{1}{3}\right)} = \frac{1}{9} - 9 = -\frac{80}{9}$

$\therefore$ tangent meets curve again at $\left(\frac{1}{3}, -\frac{80}{9}\right)$

page 494 **Exercise 23C**

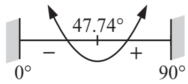
2 h Solution should be:

$$y = \ln(\ln x)$$

$$\therefore \frac{dy}{dx} = \frac{\frac{1}{x}}{\ln x} = \frac{1}{x \ln x}$$

page 521 **Exercise 24B**

5 Sign diagram should be:



page 558 **Exercise 26J**

3 b Fourth line should be:

$$\text{Area} = \int_0^2 [0 - (-x^3 + 6x^2 - 8x)]\, dx + \int_2^4 [(-x^3 + 6x^2 - 8x) - 0]\, dx$$