

ERRATA

MATHEMATICS FOR THE INTERNATIONAL STUDENT MATHEMATICS HL second edition - WORKED SOLUTIONS

Second edition - 2009 initial print

page 7 **EXERCISE 1B.1** question **10**, the last line should read:

- 10** Now, substituting $b = -1$ into (1) gives $a = 2 - (-1) = 3$.
So, $a = 3$, $b = -1$, $c = -4$, and $T(x) = 3x^2 - x - 4$.

page 34 **EXERCISE 1I** question **9 a ii**, should read:

- 9 a ii** g is $y = \sqrt{x}$ where $y \geq 0$
so g^{-1} is $x = \sqrt{y}$ where $x \geq 0$
 $\therefore y = x^2$
 $\therefore g^{-1}(x) = x^2, x \geq 0$
 $\therefore g^{-1}(4) = 4^2$
 $\therefore g^{-1}(4) = 16$

page 51 **EXERCISE 2E.1** question **4 c**, should read:

$$\begin{aligned} \mathbf{4 c} \quad \sum_{k=1}^n (a_k + b_k) &= (a_1 + b_1) + (a_2 + b_2) + \dots + (a_n + b_n) \\ &= (a_1 + a_2 + \dots + a_n) + (b_1 + b_2 + \dots + b_n) \\ &= \sum_{k=1}^n a_k + \sum_{k=1}^n b_k \end{aligned}$$

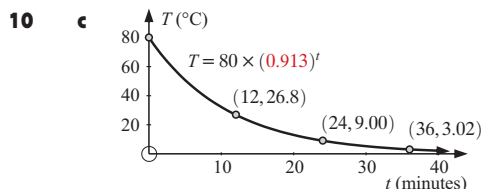
page 67 **REVIEW SET 2B** question **7 b**, should read:

7 b $\sum_{k=1}^{15} 50(0.8)^{k-1} \approx 50 + 40 + 32 + \dots + 3.436 + 2.749 + 2.199$
This series is geometric with $u_1 = 50$, $r = 0.8$ and $n = 15$.
 \therefore the sum is $\frac{50[1 - (0.8)^{15}]}{1 - 0.8} \approx 241$

page 85 **EXERCISE 3G.1** question **4 b**, should read:

4 b At year 2018, $t = 20$
 $\therefore B_{20} = 12 \times 2^{0.18 \times 20}$
 $= 12 \times 2^{3.6}$
 ≈ 145.509
 ≈ 146 bears

page 88 **REVIEW SET 3A** question **10 c**, should have correct function formula:



page 88 **REVIEW SET 3A** question **10 c**, should have correct function formula:

10 c When $W_t = 1\%$ of 1000 grams = 10 g,
 $1000 \times 2^{-0.04t} = 10$
 $\therefore 2^{-0.04t} = 0.01$
 $\therefore \log 2^{-0.04t} = \log(0.01)$
and so $-0.04t \log 2 = \log(0.01)$
 $\therefore t = \frac{\log(0.01)}{-0.04 \times \log 2}$
 $\therefore t \approx 166$ years

page 119 **EXERCISE 5A** question **9 d**, the last line should read:

- 9 d** $2^x > 0$ for all x as the graph is always above the x -axis. ✓

page 160 **EXERCISE 6G** question **10**, the second to last line should read:

$$10 = \frac{10 \pm \sqrt{-20}}{2}$$

∴ x has no real solutions, so it is not possible.

page 234 **REVIEW SET 8A** question **10**, should read:

- 10** In the expansion of $(2x^2 - \frac{1}{x})^6$, $a = 2x^2$, $b = -\frac{1}{x}$, $n = 6$

$$T_{r+1} = \binom{n}{r} a^{n-r} b^r$$

$$= \binom{6}{r} (2x^2)^{6-r} \left(-\frac{1}{x}\right)^r$$

$$= \binom{6}{r} 2^{6-r} x^{12-2r} (-1)^r x^{-r}$$

$$= \binom{6}{r} 2^{6-r} (-1)^r x^{12-3r}$$

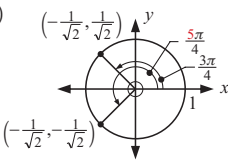
For the constant term we let $12 - 3r = 0$
∴ $r = 4$

and $T_5 = \binom{6}{4} 2^2 (-1)^4 x^0$
∴ the constant term is $\binom{6}{4} 2^2 (-1)^4 = 60$.

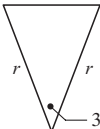
page 264 **EXERCISE 10C.1** question **9 b**, should read:

- 9 b** $\cos^2 \theta + \sin^2 \theta = 1$
∴ $\cos^2 \theta + \frac{4}{25} = 1$
∴ $\cos^2 \theta = \frac{21}{25}$
∴ $\cos \theta = \pm \frac{\sqrt{21}}{5}$
But θ is in quadrant 2
where $\cos \theta < 0$
∴ $\cos \theta = -\frac{\sqrt{21}}{5}$

page 266 **EXERCISE 10C.3** question **3 g**, should read:

- 3 g** $\sin(\frac{3\pi}{4}) - \cos(\frac{5\pi}{4})$
 $= \frac{1}{\sqrt{2}} - (-\frac{1}{\sqrt{2}})$
 $= \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}$
 $= \frac{2}{\sqrt{2}}$ or $\sqrt{2}$
- 

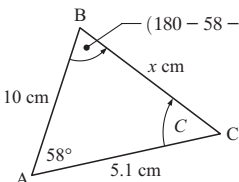
page 269 **EXERCISE 10D** question **9**, should not divide by 12° :

- 9**  total area of 8 coins area of \$10 note fraction covered
- $$= 8 \times 12 \times \frac{1}{2} r^2 \sin 30^\circ = 8r \times 4r = \frac{24r^2}{32r^2}$$
- $$= 48r^2 \left(\frac{1}{2}\right) = 32r^2$$
- $$= 24r^2 = \frac{3}{4} \therefore \frac{1}{4} \text{ is uncovered}$$

page 277 **EXERCISE 11B.2** question **3**, should approximate correctly:

- 3** The third angle is $180^\circ - 85^\circ - 68^\circ = 27^\circ$
- $$\frac{\sin 85^\circ}{11.4} \quad \text{and} \quad \frac{\sin 27^\circ}{9.8}$$
- $$\approx 0.08739 \quad \approx 0.04633$$
- ∴ it is not possible as $\frac{\sin 85^\circ}{11.4} \neq \frac{\sin 27^\circ}{9.8}$
∴ the sine rule is violated.

page 278 **EXERCISE 11B.2** question **6**, should read:

- 6 a** 
- $$\frac{\sin C}{10} = \frac{\sin(122 - C)}{5.1}$$
- ∴ $5.1 \sin C = 10 \sin(122 - C)$
Using technology,
 $C \approx 91.3^\circ$

page 280 **EXERCISE 11C** question **8**, should read:

8 Using Pythagoras' theorem

$$RQ = \sqrt{4^2 + 7^2} = \sqrt{65} \text{ cm}$$

$$PQ = \sqrt{8^2 + 7^2} = \sqrt{113} \text{ cm}$$

$$PR = \sqrt{8^2 + 4^2} = \sqrt{80} \text{ cm}$$

Now $\cos Q = \frac{(\sqrt{113})^2 + (\sqrt{65})^2 - (\sqrt{80})^2}{2 \times \sqrt{113} \times \sqrt{65}}$

$$\therefore \cos Q \approx \left(\frac{98}{171.4}\right)$$

$$\therefore Q \approx \cos^{-1}\left(\frac{98}{171.4}\right)$$

$$\therefore Q \approx 55.1 \quad \text{So, } \widehat{PQR} \text{ measures } 55.1^\circ$$

page 299 **EXERCISE 12G** question **5**, should read:

5 c When $C(t) = \$1.10 \text{ L}^{-1}$ then $9.2 \sin \frac{\pi}{7}(t - 4) + 107.8 = 110$

$$\therefore \sin \frac{\pi}{7}(t - 4) = \frac{2.2}{9.2} \approx 0.23913$$

$$\therefore \frac{\pi}{7}(t - 4) \approx 0.2415 \text{ or } \pi - 0.2415$$

$$\therefore t - 4 \approx 0.538 \text{ or } 6.462$$

$$\therefore t \approx 4.54 \text{ or } 10.46 \pm 14k \text{ \{period is 14 days\}}$$

So, the price is \$1.10 per litre on the 5th, 11th, 19th and 25th days.

page 334 **EXERCISE 13B.7** question **4 a**, should read:

4 a If $\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} w & x \\ y & z \end{pmatrix} = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ then $\begin{pmatrix} aw + by & ax + bz \\ cw + dy & cx + dz \end{pmatrix} = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$

If $w = z = 1$ and $x = y = 0$, then

$$\text{LHS} = \begin{pmatrix} a(1) + b(0) & a(0) + b(1) \\ c(1) + d(0) & c(0) + d(1) \end{pmatrix} = \begin{pmatrix} a & b \\ c & d \end{pmatrix} = \text{RHS} \quad \checkmark$$

page 338 **EXERCISE 13C.1** question **7 b iii**, should read:

7 b Check:

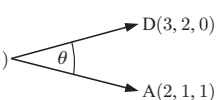
ii $2\mathbf{A} = 2 \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} = \begin{pmatrix} 2 & 4 \\ 6 & 8 \end{pmatrix}$ iii $-\mathbf{A} = \begin{pmatrix} -1 & -2 \\ -3 & -4 \end{pmatrix}$

$$|2\mathbf{A}| = 2(8) - 4(6) = -8 \quad \checkmark \quad |-\mathbf{A}| = (-1)(-4) - (-2)(-3) = -2 \quad \checkmark$$

page 368 **REVIEW SET 13C** question **6 b**, first line should read:

6 b $\mathbf{M} = \begin{pmatrix} k & 2 \\ 2 & k \end{pmatrix} \begin{pmatrix} k-1 & -2 \\ -3 & k \end{pmatrix}$

page 399 **EXERCISE 14I** question **18 b**, first line should include diagram:

18 b $M\left(\frac{3}{2}, \frac{5}{2}, \frac{3}{2}\right)$  Now $\overrightarrow{MD} = \begin{pmatrix} \frac{3}{2} \\ -\frac{1}{2} \\ -\frac{3}{2} \end{pmatrix}$ and $\overrightarrow{MA} = \begin{pmatrix} \frac{1}{2} \\ -\frac{3}{2} \\ -\frac{1}{2} \end{pmatrix}$

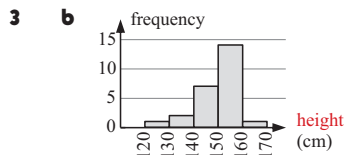
page 410 **REVIEW SET 14A** question **4**, last 3 lines should read:

4 If $\cos \theta = -0.8851$ and $\sin \theta = -0.4654$, θ is in Quadrant 3

$$\therefore \theta = 180^\circ + \cos^{-1}(0.8851) \approx 207.7^\circ$$

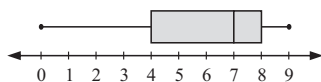
\therefore Dino is 4.84 km from the start at a bearing of 208° .

page 506 **EXERCISE 17A** question **3 b**, should have correct x -axis label:



page 514 EXERCISE 17D.2 question 3 b, should have correctly labelled parts ii to iv:

3 b ii



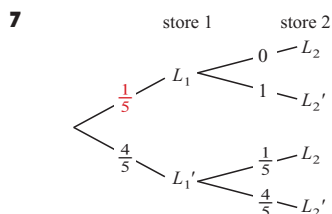
iii range = $9 - 0$
= 9

iv IQR = $Q_3 - Q_1$
= $8 - 4$
= 4

page 536 EXERCISE 18G question 3 b iii, second line should read:

3 b iii $P(\text{at least 2 strawberry creams})$
= $P(\text{all S or 3S, 1S' or 2S, 2S'})$

page 553 REVIEW SET 18C question 7, diagram should read:



page 580 EXERCISE 20C question 3 f, second line should read:

3 f $= \frac{d}{dx} (x(2x^2 - 3x - 5))$

page 584 EXERCISE 20D.2 question 4 b, should read:

4 b We know that $\frac{dy}{du} \frac{du}{dx} = \frac{dy}{dx}$ {chain rule}

Letting $x = y$, $\frac{dy}{du} \frac{du}{dy} = \frac{dy}{dy}$

$\therefore \frac{dy}{du} \frac{du}{dy} = 1$

Letting $u = x$, $\frac{dy}{dx} \frac{dx}{dy} = 1$

page 591 EXERCISE 20F question 3 d, 4th line should read:

3 d The tangents to the curve with gradient -3 touch the curve when

page 604 REVIEW SET 20B question 8, second to last line should read:

8 When $x = -4$, $y = (-4)^3 + 2(-4)^2 - 4(-4) + 3 = -13$
 \therefore the curve cuts the tangent at $(-4, -13)$.

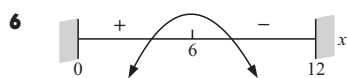
page 628 EXERCISE 21F question 1 d, second to last line should read:

1 d and $f'(-2) = 0$
 \therefore there is a horizontal inflection at $(-2, -3)$

page 637 EXERCISE 21G question 16 b, last line should read:

16 b $\therefore [D(t)]_{\min}^2 \approx 3550 \text{ km}^2$

page 645 REVIEW SET 21B question 6, last diagram should have labelled axis:



page 651 EXERCISE 22A question 2 h, third line should read:

2 h $f(x) = \frac{e^x + 2}{e^{-x} + 1}$

$\therefore f'(x) = \frac{e^x(e^{-x} + 1) - (e^x + 2)(-e^{-x})}{(e^{-x} + 1)^2}$

{quotient rule}

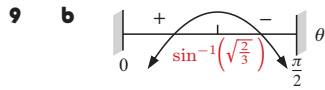
page 656 **EXERCISE 22B** question **8 c**, first line should read:

$$\mathbf{8 \quad c} \quad \frac{dy}{dx} = e^x + 3e^{-x}$$

page 697 **REVIEW SET 23A** question **3 b**, second to last line should read:

$$\mathbf{3 \quad b} \quad \text{and } f''(x) = -\frac{1}{4}x^{-\frac{3}{2}} \cos(4x) + \frac{1}{2}x^{-\frac{1}{2}}(-4 \sin(4x)) - \left[2x^{-\frac{1}{2}} \sin(4x) + 4x^{\frac{1}{2}} \times 4 \cos(4x) \right] \\ = -\frac{1}{4}x^{-\frac{3}{2}} \cos(4x) - 4x^{-\frac{1}{2}} \sin(4x) - 16x^{\frac{1}{2}} \cos(4x)$$

page 699 **REVIEW SET 23A** question **9 b**, sign diagram should read:



page 799 **EXERCISE 28B** question **4**, should have correctly labelled parts:

4 a The random variable represents the number of hits that Sally has in each game.

$$\mathbf{b} \quad 0.07 + 0.14 + k + 0.46 + 0.08 + 0.02 = 1 \quad \{\text{since } \sum P(i) = 1\} \\ \therefore k + 0.77 = 1 \\ \therefore k = 0.23$$

$$\mathbf{c \quad i} \quad P(X \geq 2) \\ = P(X = 2 \text{ or } X = 3 \text{ or } X = 4 \text{ or } X = 5) \\ = P(2) + P(3) + P(4) + P(5) \\ = 0.23 + 0.46 + 0.08 + 0.02 \\ = 0.79$$
$$\mathbf{ii} \quad P(1 \leq X \leq 3) \\ = P(1) + P(2) + P(3) \\ = 0.14 + 0.23 + 0.46 \\ = 0.83$$

page 815 **REVIEW SET 28A** question **1 a**, should read:

$$\mathbf{1 \quad a} \quad P(x) = \frac{a}{x^2 + 1} \quad \text{for } x = 0, 1, 2, 3$$

page 827 **EXERCISE 29C.1** question **2 e**, should read:

$$\mathbf{2 \quad e} \quad P(-0.86 \leq Z \leq 0.32) \\ = P(Z \leq 0.32) - P(Z < -0.86) \\ \approx 0.6255 - 0.1949 \\ \approx 0.431$$