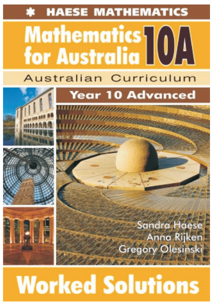


ERRATA

Mathematics for Australia 10A

Worked Solutions

2013 First Edition, initial print

The following erratum was made on 02/Jan/2020

page 582 **CHAPTER 23 EXERCISE 23D.3,** Question **4 a** should read:

4 **a** For $H(t) = 4\sin[45(t-2)]^\circ + 4$:

- the amplitude is $|4| = 4$
- the period is $\frac{360}{45} = 8$ seconds
- the horizontal translation is 2 seconds to the right
- the principal axis is $H = 4$.

The following errata were made on or before 16/Jul/2015

page 19 **CHAPTER 1 PRACTICE TEST 1C,** Question **1 a ii** should read:

1 **a** **i** 1 hour = 60 minutes
$= 60 \times 60$ seconds {1 minute = 60 s}
$= 3600$ seconds
and $2.998 \times 10^8 \times 3600$
$= 1.079\,28 \times 10^{12}$
$\approx 1.079 \times 10^{12}$
So, light travels about 1.079×10^{12} m in one hour (in a vacuum).

ii 1 day = 24 hours
$= 24 \times 3600$ seconds {using **a i**}
$= 86\,400$ seconds
and $2.998 \times 10^8 \times 86\,400$
$= 2.590\,272 \times 10^{13}$
$\approx 2.590 \times 10^{13}$
So, light travels about 2.590×10^{13} m in one day (in a vacuum).

page 74 **CHAPTER 4 EXERCISE 4B.2,** Question **2 h** should read:

2 **g** $\frac{3b+9}{6}$
$= \frac{3(b+3)}{6}$ ← HCF is 3
$= \frac{{}^1\cancel{3}(b+3)}{{}_2\cancel{6}}$
$= \frac{b+3}{2}$

h $\frac{8b-12}{6}$
$= \frac{4(2b-3)}{6}$ ← HCF is 4
$= \frac{{}^2\cancel{4}(2b-3)}{{}_3\cancel{6}}$
$= \frac{2(2b-3)}{3}$
$= \frac{4b-6}{3}$

page 92 **CHAPTER 4 PRACTICE TEST 4C,** Question **3 c ii** should not cancel a division by 0:

3 **c** Using **b**, $\left(a - \frac{9}{a}\right) \div \left(1 - \frac{a}{3}\right) = \frac{3(a+3)}{-a}$

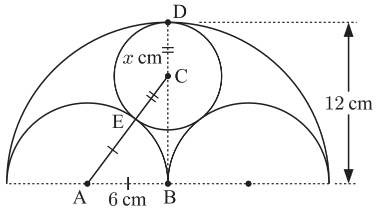
i When $a = 1$,
$\frac{3(a+3)}{-a} = \frac{3(1+3)}{-1}$
$= \frac{3 \times 4}{-1}$
$= \frac{12}{-1}$
$= -12$

ii When $a = 3$,
$1 - \frac{a}{3} = 1 - \frac{3}{3}$
$= 1 - 1$
$= 0$
$\therefore \left(a - \frac{9}{a}\right) \div \left(1 - \frac{a}{3}\right)$
$= \left(a - \frac{9}{a}\right) \div 0$
which is undefined

iii When $a = 5$,
$\frac{3(a+3)}{-a} = \frac{3(5+3)}{-5}$
$= \frac{3 \times 8}{-5}$
$= \frac{24}{-5}$
$= -\frac{24}{5}$

page 145 **CHAPTER 6 EXERCISE 6E,** Question **14 a ii** should read:

14 **a** **ii** Consider the 'upper' semi-circle:



Suppose the radius of the smallest circle is x cm and CB = DB − DC = $(12 - x)$ cm.
We construct [AC], which passes through E.

Now, AE = 6 cm {from **a i**}

$\therefore$ AC = $(6 + x)$ cm

$\therefore$ $(6+x)^2 = 6^2 + (12-x)^2$ {Pythagoras in $\triangle$ABC}

$\therefore$ $\cancel{36} + 12x + \cancel{x^2} = \cancel{36} + 144 - 24x + \cancel{x^2}$

$\therefore$ $12x = 144 - 24x$

$\therefore$ $36x = 144$

$\therefore$ $x = 4$

$\therefore$ the radius of the smallest circles is 4 cm.

page 147 **CHAPTER 6 EXERCISE 6F,** Questions **10** and **11** should begin with measures in metres:

10 Let the diagonal [BD] be $2x$ m.

11 Consider the pyramid on top of the tower. Let the diagonal [AC] be $2x$ m.

page 153 **CHAPTER 6 PRACTICE TEST 6B,** Question **7** should have correctly labelled diagram:

7 Suppose the foot of the ladder is x m from the wall.

$\therefore$ the ladder reaches $2x$ m up the wall.

$\therefore$ $x^2 + (2x)^2 = 15^2$ {Pythagoras}

$\therefore$ $x^2 + 4x^2 = 225$

$\therefore$ $5x^2 = 225$

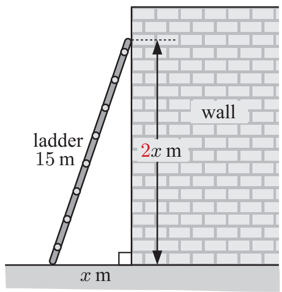
$\therefore$ $x^2 = 45$

$\therefore$ $x = \sqrt{45}$ {as $x > 0$}

$\therefore$ $2x = 2\sqrt{45}$

$\therefore$ $2x \approx 13.42$ m

The ladder reaches about 13.4 m up the wall.



page 189 **CHAPTER 8 EXERCISE 8B,** Question **1 b** should read:

1 **a** $C = 2\pi r$ where $r = 4.2$

$\therefore$ $C = 2 \times \pi \times 4.2$

≈ 26.4

$\therefore$ the circumference is approximately 26.4 cm.

b $C = 2\pi r$ where $C = 112$

$\therefore$ $112 = 2\pi r$

$\therefore$ $r = \dfrac{112}{2\pi}$

≈ 17.8

$\therefore$ the radius is approximately 17.8 cm.

page 200 **CHAPTER 8 EXERCISE 8D,** Question **7 b i** should read:

7 **b** **i** $A = 180, \; a = 8, \; b = 6$

$\therefore$ $c = \dfrac{180 - 2 \times 8 \times 6}{2(8+6)}$

$= \dfrac{84}{2 \times 14}$

$= 3$

page 256 **CHAPTER 10 EXERCISE 10E,** Question **2 h** should not magically alter a term:

2 **g**

$$x^2 + 1 = 3x$$
$$\therefore \quad x^2 - 3x + 1 = 0 \quad \text{which has}$$
$$a = 1, \; b = -3, \; c = 1$$
$$\therefore \quad x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(1)}}{2(1)}$$
$$\therefore \quad x = \frac{3 \pm \sqrt{9-4}}{2}$$
$$\therefore \quad x = \frac{3 \pm \sqrt{5}}{2}$$

h

$$2x^2 = 2x - 3$$
$$\therefore \quad 2x^2 - 2x + 3 = 0 \quad \text{which has}$$
$$a = 2, \; b = -2, \; c = 3$$
$$\therefore \quad x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(2)(3)}}{2(2)}$$
$$\therefore \quad x = \frac{2 \pm \sqrt{4 - 24}}{4}$$
$$\therefore \quad x = \frac{2 \pm \sqrt{-20}}{4}$$

but $-20 < 0$

$\therefore$ no real solutions exist.

page 275 **CHAPTER 11 EXERCISE 11A,** Question **2 e** should subtract a negative number correctly:

2 **d**

$$\text{AB} = \sqrt{(-\sqrt{2} - \sqrt{2})^2 + (0-0)^2}$$
$$= \sqrt{(-2\sqrt{2})^2 + 0^2}$$
$$= \sqrt{8} \text{ units}$$
$$\text{AC} = \sqrt{(0 - \sqrt{2})^2 + (-\sqrt{5} - 0)^2}$$
$$= \sqrt{(-\sqrt{2})^2 + (-\sqrt{5})^2}$$
$$= \sqrt{2+5}$$
$$= \sqrt{7} \text{ units}$$
$$\text{BC} = \sqrt{(0 - -\sqrt{2})^2 + (-\sqrt{5} - 0)^2}$$
$$= \sqrt{(\sqrt{2})^2 + (-\sqrt{5})^2}$$
$$= \sqrt{2+5}$$
$$= \sqrt{7} \text{ units}$$

Since AC = BC, triangle ABC is isosceles.

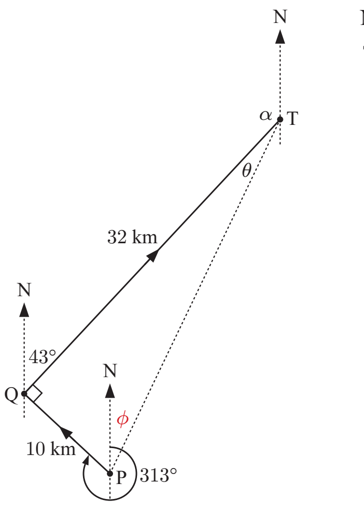
e

$$\text{AB} = \sqrt{(-\sqrt{3} - \sqrt{3})^2 + (1-1)^2}$$
$$= \sqrt{(-2\sqrt{3})^2 + 0^2}$$
$$= \sqrt{12} \text{ units}$$
$$\text{AC} = \sqrt{(0 - \sqrt{3})^2 + (-2 - 1)^2}$$
$$= \sqrt{(-\sqrt{3})^2 + (-3)^2}$$
$$= \sqrt{3+9}$$
$$= \sqrt{12} \text{ units}$$
$$\text{BC} = \sqrt{(0 - -\sqrt{3})^2 + (-2 - 1)^2}$$
$$= \sqrt{(\sqrt{3})^2 + (-3)^2}$$
$$= \sqrt{3+9}$$
$$= \sqrt{12} \text{ units}$$

Since AB = AC = BC, triangle ABC is equilateral.

page 327 **CHAPTER 12 EXERCISE 12F,** Question **12** should work out the bearing in part **a**:

12



$$\widehat{\text{NPQ}} = 360° - 313° = 47° \quad \{\text{angles at a point}\}$$
$$\widehat{\text{TQP}} = 180° - 43° - 47° \quad \{\text{cointerior angles}\}$$
$$= 90°$$

a

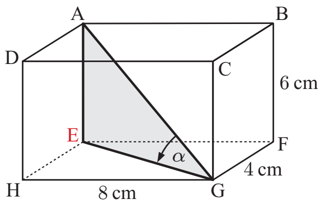
$$\text{TP}^2 = 10^2 + 32^2 \quad \{\text{Pythagoras}\}$$
$$\therefore \quad \text{TP} = \sqrt{10^2 + 32^2} \quad \{\text{as TP} > 0\}$$
$$\therefore \quad \text{TP} \approx 33.5$$
$$\tan\theta = \tfrac{10}{32} \quad \{\tan\theta = \frac{\text{OPP}}{\text{ADJ}}\}$$
$$\therefore \quad \theta = \tan^{-1}\left(\tfrac{10}{32}\right)$$
$$\therefore \quad \theta \approx 17.4°$$
$$\alpha = 180° - 43° = 137° \quad \{\text{cointerior angles}\}$$
$$\phi = 180° - \alpha - \theta \quad \{\text{cointerior angles}\}$$
$$\approx 180° - 137° - 17.4°$$
$$\approx 25.6°$$

So, the trawler is about 33.5 km from P, on a bearing of $\approx 025.6°$.

b The trawler must sail on a bearing of $360° - 137° - 17.4° \approx 206°$.

page 331 **CHAPTER 12 REVIEW SET 12,** Question **10 b** should have vertex E labelled:

10 **b**



$(\text{EG})^2 = 4^2 + 8^2$ {Pythagoras}

$\therefore\ \text{EG} = \sqrt{80}$

$\tan\alpha = \dfrac{6}{\sqrt{80}}$ $\{\tan\alpha = \dfrac{\text{OPP}}{\text{ADJ}}\}$

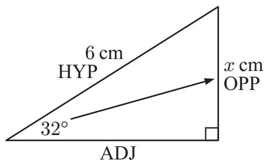
$\therefore\ \alpha = \tan^{-1}(\frac{6}{\sqrt{80}})$

$\therefore\ \alpha \approx 33.9°$

$\therefore\ \text{A}\widehat{\text{G}}\text{E} \approx 33.9°$

page 334 **CHAPTER 12 PRACTICE TEST 12B,** Question **3 a** should not give the answer in degrees:

3 **a**



$\sin 32° = \dfrac{x}{6}$ $\{\sin\theta = \dfrac{\text{OPP}}{\text{HYP}}\}$

$\therefore\ 6 \times \sin 32° = x$ {multiplying both sides by 6}

$\therefore\ x \approx 3.18$ {calculator}

page 348 **CHAPTER 13 EXERCISE 13D,** Question **4 a** should read:

4 **a**

Distance d (m)	*Frequency*	*Interval midpoint*	*Product*
$20 \leqslant d < 30$	2	25	50
$30 \leqslant d < 40$	6	35	210
$40 \leqslant d < 50$	26	45	1170
$50 \leqslant d < 60$	12	55	660
$60 \leqslant d < 70$	3	65	195
$70 \leqslant d < 80$	1	75	75
Total	50		2360

$\therefore$ mean

$= \dfrac{\text{sum of data values}}{\text{the number of data values}}$

$\approx \dfrac{2360}{50}$

≈ 47.2 m

page 401 **CHAPTER 15 PRACTICE TEST 15C,** Question **2 a** should read:

2 **a** $\dfrac{\text{BC}}{\sin 60°} = \dfrac{12}{\sin 40°}$ {sine rule}

$\therefore\ \text{BC} = \dfrac{12 \times \sin 60°}{\sin 40°}$

$\therefore\ \text{BC} \approx 16.168$ m

$\therefore\ \text{BC} \approx 16.2$ m

$\text{DC} = \text{BC} - \text{BD}$

$\approx 16.2 - 6$

$\therefore\ \text{DC} \approx 10.2$ m

b Area $= \frac{1}{2}ab\sin C$

$\therefore\ 13.5 = \frac{1}{2} \times 6 \times \text{BE} \times \sin 40°$

$\therefore\ \text{BE} = \dfrac{9}{2 \times \sin 40°}$

$\therefore\ \text{BE} \approx 7.00$ m

page 439 **CHAPTER 17 EXERCISE 17B.1,** Question **10 c** last 3 lines should read:

10 **c** $0.442 > 0.438 > 0.120$

$\therefore$ Carina is now most likely to win at 44.2%, followed by Pia at 43.8%, and now Larry is least likely to win at only 12.0%.

page 468 **CHAPTER 18 EXERCISE 18D.1,** Question **4 a** should read:

4 **a** The graph of $y = g(x)$ is obtained by translating $f(x) = -\frac{1}{2}x - 1$ 4 units upwards.

$\therefore\ g(x) = f(x) + 4$

$= -\frac{1}{2}x - 1 + 4$

$= -\frac{1}{2}x + 3$

b The graph of $y = g(x)$ is obtained by translating $f(x) = \frac{3}{2}x + 1$ 2 units to the right.

$\therefore\ g(x) = \frac{3}{2}(x - 2) + 1$

$= \frac{3}{2}x - 3 + 1$

$= \frac{3}{2}x - 2$

page 517 **CHAPTER 20 EXERCISE 20E.2,** Question **4 b** should read:

4 **b** $\log 5000 = \log(5 \times 1000)$
$= \log 5 + \log 1000$ $\{\log(ab) = \log a + \log b\}$
$= \log 5 + \log 10^3$
$= \log 5 + 3\log 10$ $\{\log(a^n) = n\log a\}$
$= \log 5 + 3$ $\{\log 10 = 1\}$

page 518 **CHAPTER 20 EXERCISE 20E.2,** Questions **6 a**, **d** and **7 a iii** should read:

6 **a** $2 + \log 6$
$= 2\log 10 + \log 6$ $\{\log 10 = 1\}$
$= \log 10^2 + \log 6$ $\{\log(a^n) = n\log a\}$
$= \log 100 + \log 6$
$= \log(100 \times 6)$ $\{\log(ab) = \log a + \log b\}$
$= \log 600$

b $1 - \log 2$
$= \log 10 - \log 2$ $\{\log 10 = 1\}$
$= \log(\frac{10}{2})$ $\{\log\left(\frac{a}{b}\right) = \log a - \log b\}$
$= \log 5$

c $\log 80 - 1$
$= \log 80 - \log 10$ $\{\log 10 = 1\}$
$= \log(\frac{80}{10})$ $\{\log\left(\frac{a}{b}\right) = \log a - \log b\}$
$= \log 8$

d $1 + 2\log 5$
$= \log 10 + \log(5^2)$ $\{\log 10 = 1, \log(a^n) = n\log a\}$
$= \log 10 + \log 25$
$= \log(10 \times 25)$ $\{\log(ab) = \log a + \log b\}$
$= \log 250$

7 **a** **iii** $\log 250 \approx 2.397\,940\,009$
≈ 2.398

iv $\log(\frac{1}{250}) \approx -2.397\,940\,009$
≈ -2.398

page 527 **CHAPTER 20 PRACTICE TEST 20C,** Question **4 c** should be printed:

4 **c** When $N = 200$, $200 = 10 \times 1.3^t$
$\therefore\ 1.3^t = 20$
$\therefore\ \log(1.3^t) = \log 20$ {taking the log of both sides}
$\therefore\ t\log 1.3 = \log 20$ $\{\log(a^n) = n\log a\}$
$\therefore\ t = \dfrac{\log 20}{\log 1.3}$
$\therefore\ t \approx 11.4$

It will take about 11.4 weeks for Danielle's blog to have 200 followers.

page 545 **CHAPTER 22 EXERCISE 22B.1,** Question **3 b** should read:

3 **a** $f(x)g(x)$
$= (3x-1)(x+2)$
$= 3x(x+2) - 1(x+2)$
$= 3x^2 + 6x$
$\quad - x - 2$
$= 3x^2 + 5x - 2$

b $f(x)g(x)$
$= (2x^2 - x - 3)(x - 4)$
$= 2x^2(x-4) - x(x-4) - 3(x-4)$
$= 2x^3 - 8x^2$
$\quad - x^2 + 4x$
$\quad - 3x + 12$
$= 2x^3 - 9x^2 + x + 12$

page 546 **CHAPTER 22 EXERCISE 22B.1,** Question **4 d** should read:

4 **d** $4q(x) - p(x) = 4(2x^3 - 3x^2 + 6) - (x^4 - 3x^3 + 4x - 1)$
$= 8x^3 - 12x^2 + 24 - x^4 + 3x^3 - 4x + 1$
$= -x^4 + 11x^3 - 12x^2 - 4x + 25$

page 550 **CHAPTER 22 EXERCISE 22D,** Question **3 b** should read:

3 **b** Let $P(x) = px^4 - 5x^3 - 5x^2 + qx + 9$

Now $P(-1) = 0$ and $P(3) = 0$ {Factor theorem}

So, $p(-1)^4 - 5(-1)^3 - 5(-1)^2 + q(-1) + 9 = 0$

$\therefore\ p + 5 - 5 - q + 9 = 0$

$\therefore\ p - q = -9$ .... (1)

and $p(3)^4 - 5(3)^3 - 5(3)^2 + q(3) + 9 = 0$

$\therefore\ 81p - 135 - 45 + 3q + 9 = 0$

$\therefore\ 81p + 3q = 171$ .... (2)

Solving simultaneously: $3p - 3q = -27$ $\{3 \times (1)\}$

$81p + 3q = 171$ $\{(2)\}$

Adding, $84p = 144$

$\therefore\ p = \frac{12}{7}$

Substituting $p = \frac{12}{7}$ in (1) gives $\left(\frac{12}{7}\right) - q = -9$

$\therefore\ \frac{75}{7} = q$

$\therefore\ q = \frac{75}{7}$

page 563 **CHAPTER 22 PRACTICE TEST 22B,** Question **3** should read:

3

$$
\begin{array}{r l}
 & x^3 - 2x^2 + x + 4 \\
x - 4 & \overline{)\, x^4 - 6x^3 + 9x^2 + 0x - 22} \\
 & -(x^3 - 4x^3) \\
 & -2x^3 + 9x^2 \\
 & -(-2x^3 + 8x^2) \\
 & x^2 + 0x \\
 & -(x^2 - 4x) \\
 & 4x - 22 \\
 & -(4x - 16) \\
 & -6
\end{array}
$$

The quotient is $x^3 - 2x^2 + x + 4$, and the remainder is -6.

$$\therefore\ \frac{x^4 - 6x^3 + 9x^2 - 22}{x - 4} = x^3 - 2x^2 + x + 4 - \frac{6}{x - 4}$$

page 564 **CHAPTER 22 PRACTICE TEST 22B,** Question **10** should read:

10 Let $P(x) = ax^3 + 5x^2 - x + b$

Now $P(1) = 7$ and $P(-2) = -11$ {Remainder theorem}

So, $a(1)^3 + 5(1)^2 - (1) + b = 7$

$\therefore\ a + 5 - 1 + b = 7$

$\therefore\ a + b = 3$ .... (1)

and $a(-2)^3 + 5(-2)^2 - (-2) + b = -11$

$\therefore\ -8a + 20 + 2 + b = -11$

$\therefore\ -8a + b = -33$ .... (2)

Solving simultaneously: $a + b = 3$ $\{(1)\}$

$8a - b = 33$ $\{-1 \times (2)\}$

Adding, $9a = 36$

$\therefore\ a = 4$

Substituting $a = 4$ in (1) gives $(4) + b = 3$

$\therefore\ b = -1$

page 565 **CHAPTER 22 PRACTICE TEST 22C,** Question **1 a** should read:

1 **a** $f(x) = x^3 + x^2 - 17x + 15$

$\therefore\ f(-5) = (-5)^3 + (-5)^2 - 17(-5) + 15$

$= -125 + 25 + 85 + 15 = 0$

Since $f(-5) = 0$, $(x + 5)$ is a factor of $f(x)$. {Factor theorem}