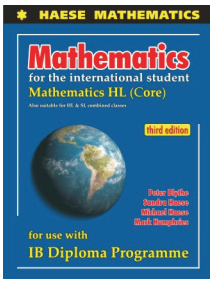


ERRATA

MATHEMATICS FOR THE INTERNATIONAL STUDENT

MATHEMATICS HL (Core) (3rd edition)

Third edition - 2017 third reprint

The following erratum was made on 25/Jul/2017

page 623 **REVIEW SET 20A 10 b,** should read:

10 **b** Show that if $\theta = \text{A}\widehat{\text{P}}\text{M} = \text{B}\widehat{\text{P}}\text{M}$, then the length of cable is given by $L(\theta) = 2\csc\theta + 3 - \cot\theta$ km.

The following erratum was made on 30/Jan/2017

page 863 **EXERCISE 27B 98,** should read:

98 Suppose 3, $3\log_y x$, $3\log_z y$, and $7\log_x z$ are consecutive terms of an arithmetic sequence.

a Prove that $x^{18} = y^{21} = z^{28}$.

b Find x in terms of: **i** y **ii** z.

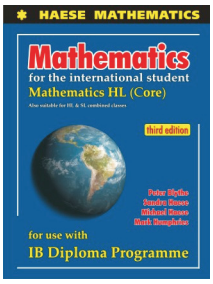
The following erratum was made on 19/Dec/2016

page 872 **ANSWERS EXERCISE 2J 12 c,** should have parts **ii** and **iii** correctly labelled and include domains on both sides:

12 **b** **i** is the only one

c **ii** Domain $= \{x \mid x \leqslant 1\}$ or Domain $= \{x \mid x \geqslant 1\}$

iii Domain $= \{x \mid x \geqslant 1\}$ or Domain $= \{x \mid x \leqslant -2\}$



ERRATA

MATHEMATICS FOR THE INTERNATIONAL STUDENT

MATHEMATICS HL (Core) (3rd edition)

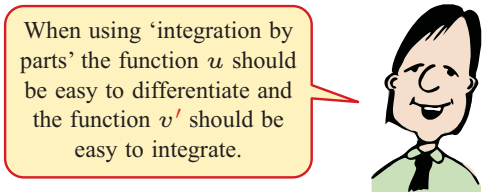
Third edition - 2015 second reprint

The following errata were made on 02/Nov/2016

page 72 **EXAMPLE 15,** last line of solution should read:

$1 \leqslant x < 2 \quad \text{or} \quad x \geqslant 5.5\,.$

page 660 **EXERCISE 21H,** advice about integration by parts should read:



page 869 **ANSWERS EXERCISE 2D 7 b,** should read:

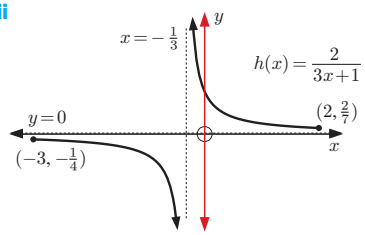
7 **b** $(g \circ f)(x) = 2x + 5, \;\; x \neq -2, \;\; \text{Domain} = \{x \mid x \neq -2\}$

page 874 **ANSWERS REVIEW SET 2B 13 c ii,** should have y axis:

13 **a** $(g \circ f)(x) = \dfrac{2}{3x+1}$ **b** $x = -\frac{1}{2}$

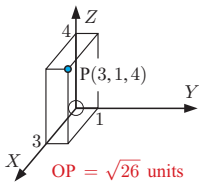
c **i** vertical asymptote $x = -\frac{1}{3}$,
horizontal asymptote $y = 0$

ii



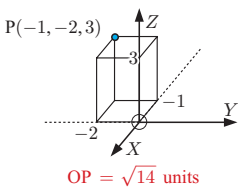
page 911 **ANSWERS EXERCISE 14G 2 c** and **d,** should state length of OP:

2 **c**



OP $= \sqrt{26}$ units

d



OP $= \sqrt{14}$ units

page 916 **ANSWERS EXERCISE 15H.1 6 b,** should read:

6 **b** If $k \neq 4$, the system is inconsistent and so has no solutions.
The lines are parallel.
If $k = 4$, the system has infinitely many solutions of the form $x = t, \;\; y = 3t - 2, \;\; t \in \mathbb{R}$. The lines are coincident.

page 921 **ANSWERS EXERCISE 16F.2 4,** Hint is for **4 b ii** not **4 a ii** :

4 **b** **ii** **Hint:** The LHS is a geometric series.

The following errata were made on 10/Jun/2016

page 47 **EXERCISE 1H 11,** should read:

11 b_1, c_1, b_2, and c_2 are real, non-zero numbers such that $b_1 b_2 = 2(c_1 + c_2)$. Show that at least one of the equations $x^2 + b_1 x + c_1 = 0$, $x^2 + b_2 x + c_2 = 0$ has two real roots.

page 84 **SELF-INVERSE FUNCTIONS first dot point,** should read:

For example:

- The function $f(x) = x$ is the **identity function**, and is also a self-inverse function.

page 86 **EXERCISE 2J 14 b iv,** should read:

14 **a** Explain why $f(x) = x^2 - 4x + 3$ is a function but does not have an inverse function.

b **i** Explain why $g(x) = x^2 - 4x + 3$ where $x \geqslant 2$ has an inverse function.

ii Show that the inverse function is $g^{-1}(x) = 2 + \sqrt{1 + x}$.

iii State the domain and range of:

A g **B** g^{-1}.

iv Show that $(g \circ g^{-1})(x) = (g^{-1} \circ g)(x)$, the identity function.

page 193 **THE REMAINDER THEOREM first line,** should clarify:

Consider the real cubic polynomial $P(x) = x^3 + 5x^2 - 11x + 3$.

page 210 **REVIEW SET 6B 1,** should declare x and y are elements of the set of integers towards the end of the question:

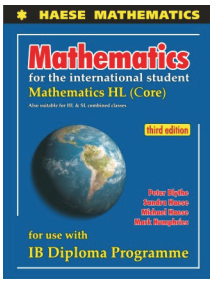
1 If $z = \left(\frac{5}{2-i} - 3 - 2i\right)^3$, express z in the form $z = x + yi$, $x, y \in \mathbb{Z}$.

page 498 **first line after proof box,** should quote property of cis correctly:

We also observe that $\text{cis}\,(-n\theta) = \text{cis}\,(0 - n\theta) = \frac{\text{cis}\,0}{\text{cis}\,n\theta}$ $\{\text{as } \frac{\text{cis}\,\theta}{\text{cis}\,\phi} = \text{cis}\,(\theta - \phi)\}$

page 503 **EXERCISE 16F.2 1,** should read:

1 In **Example 23** we showed that the cube roots of 1 are 1, w, w^2 where $w = \text{cis}\left(\frac{2\pi}{3}\right)$.



ERRATA

MATHEMATICS FOR THE INTERNATIONAL STUDENT

MATHEMATICS HL (Core) (3rd edition)

Third edition - 2013 first reprint

The following errata were made on 21/Oct/2015

page 952 **ANSWERS REVIEW SET 25C 10 a ii,** should read:

10 **a** **i** $\mu = 1.28, \quad \sigma = 1.13$ **b** ≈ 0.366

ii $\mathrm{E}(Y) = 1.14, \quad \sigma_Y = 0.566$

The following errata were made on or before 12/Jan/2015

page 26 **EXAMPLE 10 Answers parts a and b,** should read:

a For two distinct real roots, $\Delta > 0 \quad \therefore \quad k < -9$ or $k > -1, \quad k \neq 0.$

b For two real roots, $\Delta \geqslant 0 \quad \therefore \quad k \leqslant -9$ or $k \geqslant -1, \quad k \neq 0.$

page 43 **PART G Problem solving with quadratics,** second dot point should read:

Any answer we obtain must be checked to see if it is reasonable. For example:

- if we are finding a length then it must be positive and we reject any negative solutions
- if we are finding 'how many people are present' then clearly the answer must be a positive integer.

page 130 **Proof at bottom of the page,** should read:

- $\log_c(AB)$
  $= \log_c\left(c^{\log_c A} \times c^{\log_c B}\right)$
  $= \log_c\left(c^{\log_c A + \log_c B}\right)$
  $= \log_c A + \log_c B$

- $\log_c\left(\frac{A}{B}\right)$
  $= \log_c\left(\frac{c^{\log_c A}}{c^{\log_c B}}\right)$
  $= \log_c\left(c^{\log_c A - \log_c B}\right)$
  $= \log_c A - \log_c B$

- $\log_c(A^n)$
  $= \log_c\left((c^{\log_c A})^n\right)$
  $= \log_c\left(c^{n \log_c A}\right)$
  $= n \log_c A$

page 188 **DIVISION BY QUADRATICS,** blue box at top of the page should read:

If $P(x)$ is divided by $ax^2 + bx + c$ then

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

where $ax^2 + bx + c$ is the **divisor**,
$Q(x)$ is the **quotient**,
and $ex + f$ is the **remainder**.

The remainder will be linear if $e \neq 0$, and constant if $e = 0$.

page 267 **THEORY OF KNOWLEDGE,** $n = 40$ is the first counter example to Euler's statement:

In fact, $n^2 + n + 41$ is prime for all positive integers n from 1 to 39. However, checking $n = 40$ gives a counter-example to the statement, since $40^2 + 40 + 41 = 41 \times 41$.

page 289 **PERIODICITY OF TRIGONOMETRIC RATIOS,** should read:

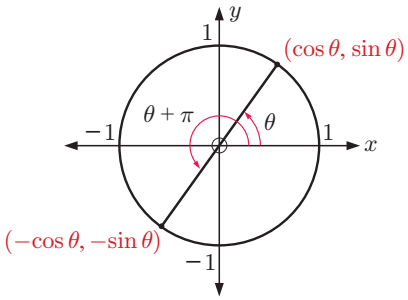
PERIODICITY OF TRIGONOMETRIC RATIOS

Since there are 2π radians in a full revolution, if we add any integer multiple of 2π to θ (in radians) then the position of P on the unit circle is unchanged.

For θ in radians and $k \in \mathbb{Z}$,
$\mathbf{\cos(\theta + 2k\pi) = \cos\theta}$ and $\mathbf{\sin(\theta + 2k\pi) = \sin\theta}$.

We notice that for any point $(\cos\theta, \sin\theta)$ on the unit circle, the point directly opposite is $(-\cos\theta, -\sin\theta)$.

$\therefore \quad \cos(\theta + \pi) = -\cos\theta$
$\sin(\theta + \pi) = -\sin\theta$
and $\tan(\theta + \pi) = \tan\theta$



For θ in radians and $k \in \mathbb{Z}$, $\mathbf{\tan(\theta + k\pi) = \tan\theta}$.

page 482 **REPRESENTING CONJUGATES,** Swap the labels of Q and Q' in the diagram:

REPRESENTING CONJUGATES

If $z = x + iy$, then $z^* = x - iy$.

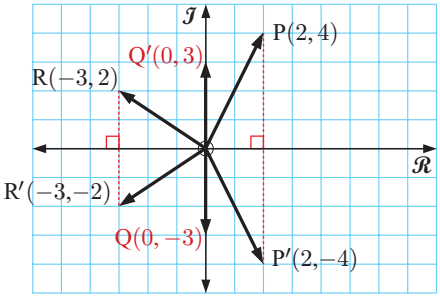
This means that if $\overrightarrow{OP} = \begin{pmatrix} x \\ y \end{pmatrix}$ represents z, then $\overrightarrow{OP'} = \begin{pmatrix} x \\ -y \end{pmatrix}$ represents z^*.

For example:

$\overrightarrow{OP}$ represents $2 + 4i$ and
$\overrightarrow{OP'}$ represents $2 - 4i$.

$\overrightarrow{OQ}$ represents $-3i$ and
$\overrightarrow{OQ'}$ represents $3i$.

$\overrightarrow{OR}$ represents $-3 + 2i$ and
$\overrightarrow{OR'}$ represents $-3 - 2i$.



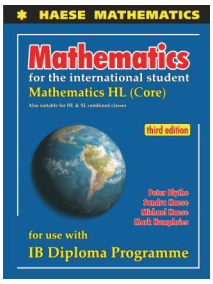
page 518 **RATES OF CHANGE,** second dot point should read:

We often judge performances by rates. For example:

- Sir Donald Bradman's average batting rate at Test cricket level was 99.94 *runs per innings.*
- Michael Jordan's average basketball scoring rate was 30.1 *points per game.*
- Rangi's average typing rate is 63 *words per minute* with an error rate of 2.3 *errors per page.*

page 653 **INVESTIGATION 3 4 b,** should read:

4 **b** Integrate $\frac{d\theta}{dx}$ with respect to x. Use $\theta(0) = 0$ to show that $\theta(x) = x$ for all x.



ERRATA

MATHEMATICS FOR THE INTERNATIONAL STUDENT

MATHEMATICS HL (Core) (3rd edition)

Third edition - 2012 initial print

The following errata also apply to books printed in 2012

page 66 **EXERCISE 2E 7 b,** should read:

7 Prove that:

a the sum of two even functions is an even function

b the difference between two odd functions is an odd function

c the product of two odd functions is an even function.

page 255 **EXAMPLE 14 Answer part c,** should read:

c The total number of combinations

$=$ the number with 3 men and 1 woman $+$ the number with 2 men and 2 women

$+$ the number with 1 man and 3 women

$= \binom{7}{3} \times \binom{6}{1} + \binom{7}{2} \times \binom{6}{2} + \binom{7}{1} \times \binom{6}{3}$

$= 665$

page 267 **THE PROCESS OF INDUCTION,** at the bottom of the page should read:

The nth odd number is $(2n-1)$, so we could also write the conjecture as:

$$1+3+5+7+9+\ldots.+(2n-1)=n^2 \quad \text{for all } n \in \mathbb{Z}^+$$

or $\sum_{i=1}^{n}(2i-1)=n^2$ for all $n \in \mathbb{Z}^+$.

page 275 **EXERCISE 9B.3 2 a,** should read:

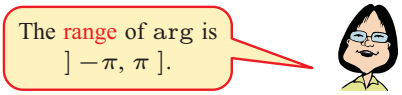
2 Use the principle of mathematical induction to prove the following propositions:

a $3^n \geqslant 1+2n$ for all $n \in \mathbb{N}$ **b** $n! \geqslant 2^n$ for all $n \in \mathbb{Z},\ n \geqslant 4$

page 493 **EXAMPLE 16,** should say in the hint:

a $2z = 2\sqrt{2}\ \text{cis}\ \theta$

$\therefore\ |2z| = 2\sqrt{2}$ and $\arg(2z) = \theta$



page 619 **EXAMPLE 11,** should say in the first line of the answer:

Let x cm be the lengths of the sides of the cube, so the surface area $A = 6x^2$ cm^2 and the volume $V = x^3$ cm^3.

page 809 **REVIEW SET 25B 1,** should read:

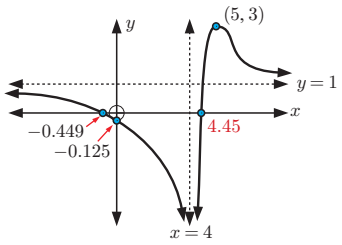
1 A discrete random variable X has probability distribution function $P(x) = k\left(\frac{3}{4}\right)^x \left(\frac{1}{4}\right)^{3-x}$ where $x = 0,\ 1,\ 2,\ 3$ and k is a constant. Find:

page 850 **EXERCISE 27A 119 f,** should read:

119 **f** The region bounded by $y = f(x)$, the x-axis, and the line $x = k$, $k > 0$, has area $\frac{1}{4}(e-1)$ units^2. Find the value of k.

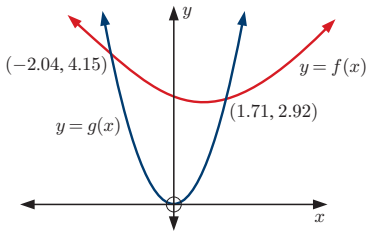
page 873 **ANSWERS EXERCISE 2K 1 c v,** should include all x-intercepts:

1 c v



page 873 **ANSWERS EXERCISE 2L 2,** graph for $y = f(x)$ should be:

2



$x = -2.04$
or $x = 1.71$

page 873 **ANSWERS REVIEW SET 2A 5 b,** should have open intervals:

5 **a** $x = -1$ or 3 **b** $x \in]-\infty, -8[$ or $]2, \infty[$

page 877 **ANSWERS EXERCISE 3F 6 d iii,** should read:

6 d iii $y \approx 2.62$

page 880 **ANSWERS EXERCISE 4G 1 e,** should read:

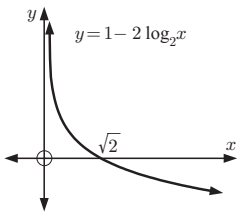
1 e **i** Domain is $\{x \mid x > 0\}$, range is $\{y \mid y \in \mathbb{R}\}$

ii VA is $x = 0$, x-intercept $\sqrt{2}$, no y-intercept

iv $x = 2$

v $f^{-1}(x) = 2^{\frac{1-x}{2}}$

iii

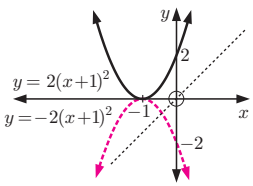


page 881 **ANSWERS EXERCISE 4H 5,** should read:

5 9 years

page 885 **ANSWERS EXERCISE 5D 1 f,** graphs should have x-intercept -1:

1 f



page 885 **ANSWERS EXERCISE 5E 1 d,** should read:

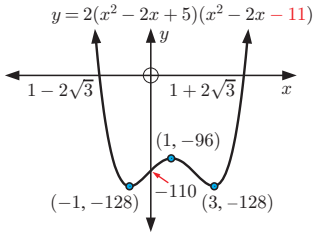
1 d A reflection in the x-axis, then a vertical stretch with scale factor 2.

page 890 **ANSWERS REVIEW SET 5B 11 c,** should read:

11 **b** $(1, 1)$ and $(2, -1)$ **c** VA is $x = \frac{3}{2}$, y-int is $\frac{1}{3}$

page 894 **ANSWERS REVIEW SET 6B 17 b,** graph should have function:

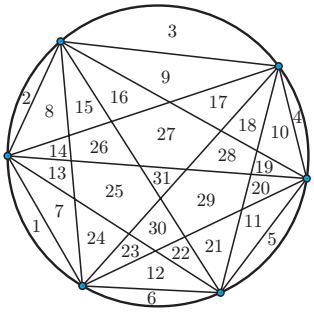
17 b



page 898 **ANSWERS EXERCISE 9A 5 b and 5 c, should read:**

5 **b** *Conjecture*: The number of regions for n points placed around a circle is given by $C_n = 2^{n-1}$, $n \in \mathbb{Z}^+$.

c $n = 6$



No. By the conjecture we expect $2^5 = 32$ regions, but there are only 31.

page 899 **ANSWERS EXERCISE 10D.2 2 b, should read:**

2 **b** $\theta = 0,\ \pi,$ or 2π

page 899 **ANSWERS EXERCISE 10E 3, should read:**

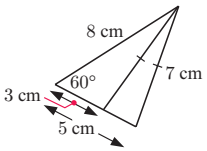
3 **Hint:** $\theta - \phi = -(\phi - \theta)$

page 900 **ANSWERS EXERCISE 11B 10 b, should read:**

10 **a** $x = 2$ **b** $4\sqrt{6}$ cm^2 **11** $63°,\ 117°,\ 36°,\ 144°$

page 900 **ANSWERS REVIEW SET 11A 3 b and 9 b ii, should read:**

3 **a** $x = 3$ or 5 **b** Kady can draw 2 triangles, so she should ask for more information.



9 **a** maximum value 16 when $x = 6$

b **i** $y = 12 - x$ **ii** $y^2 = x^2 - (16\cos\theta)x + 64$

page 903 **ANSWERS EXERCISE 12E 2 c, should read:**

2 **a** translation through $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$ **b** reflection in x-axis

c horizontal stretch, factor 2 and vertical stretch with factor 2

page 906 **ANSWERS REVIEW SET 12C 7 a, should read:**

7 **a** $y = \frac{3}{4}\sin(4x - 0.340) + \frac{1}{4}$ **b** $y = \tan(x - \frac{\pi}{2})$

page 906 **ANSWERS EXERCISE 13A.3 3 f, should read:**

3 **e** $-\frac{\pi}{2} \leqslant 2(x - \frac{\pi}{4}) \leqslant \frac{7\pi}{2}$ **f** $-2\pi \leqslant -x \leqslant 0$

page 914 **ANSWERS EXERCISE 15A 2, 3, and 5, should read:**

2 **a** 1.34 m s^{-1} in the direction 26.6° to the left of her intended line.

b **i** 30° to the right of Q **ii** 1.04 m s^{-1}

3 **a** 24.6 km h^{-1} **b** $\approx 9.93°$ east of south

4 **a** 82.5 m **b** 23.3° to the left of straight across **c** 48.4 s

5 **a** The plane's speed in still air would be ≈ 437 km h^{-1}. The wind slows the plane down to 400 km h^{-1}.

b 4.64° north of due east

page 915 **ANSWERS EXERCISE 15D 1, should read:**

1 75.7° **2** $\mathbf{b}_1 \bullet \mathbf{b}_2 = 0$ **3** 75.5°

page 917 **ANSWERS REVIEW SET 15B 6**, should read:

6 **a** $x_1(t) = 2 + t$, $y_1(t) = 4 - 3t$, $t \geqslant 0$
b $x_2(t) = 13 - t$, $y_2(t) = [3 - 2a] + at$, $t \geqslant 2$
c interception occurred at 2:22:30 pm
d bearing $\approx 12.7°$ west of south, ≈ 4.54 units per minute

page 919 **ANSWERS EXERCISE 16B.1 4 b**, should read:

4 **a** 1 **b** $|r|$

page 919 **ANSWERS EXERCISE 16C.1 3**, should read:

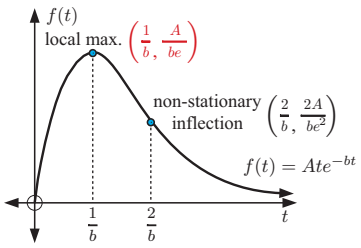
3 $k\sqrt{2}\ \text{cis}\left(\frac{\pi}{4}\right)$ if $k > 0$, $-k\sqrt{2}\ \text{cis}\left(-\frac{3\pi}{4}\right)$ if $k < 0$,
not possible if $k = 0$

page 927 **ANSWERS EXERCISE 19B 7**, should read:

7 **a** decreasing for $-1 < x < 1$, never increasing
b increasing for $-1 < x < 1$, never decreasing

page 930 **ANSWERS EXERCISE 19D.1 12 b**, should read:

12 **b**

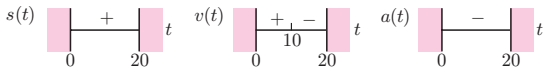


page 930 **ANSWERS REVIEW SET 19A 8 c**, should read:

8 **c** $f'(x) \leqslant 0$ for $x < 1$ and $1 < x \leqslant 2$
and $f'(x) \geqslant 0$ for $x \geqslant 2$

page 932 **ANSWERS EXERCISE 20A.2 2 a**, should read:

2 **a** $v(t) = 98 - 9.8t\ \text{m s}^{-1}$, $a(t) = -9.8\ \text{m s}^{-2}$



page 933 **ANSWERS EXERCISE 20B 15**, should read:

15 $\frac{21}{\sqrt{2}}\ \text{cm}^2$ per radian

page 934 **ANSWERS EXERCISE 20C 30**, should read:

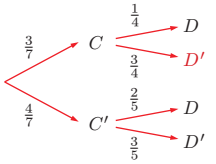
30 at grid reference $(3.54,\ 8)$, ≈ 15.6 km

page 941 **ANSWERS EXERCISE 22C.2 8**, should read:

8 **a** $v(t) = \dfrac{1}{t+1} - 1\ \text{m s}^{-1}$ **b** $s(t) = \ln|t+1| - t$ metres
c $s(2) = \ln 3 - 2 \approx -0.901$ m, $v(2) = -\frac{2}{3}\ \text{m s}^{-1}$,
$a(2) = -\frac{1}{9}\ \text{m s}^{-2}$
The object is approximately 0.901 m to the left of the origin,
travelling left at $\frac{2}{3}\ \text{m s}^{-1}$, with acceleration $-\frac{1}{9}\ \text{m s}^{-2}$.

page 948 **ANSWERS REVIEW SET 24B 7 a**, should read:

7 **a**



b **i** $\frac{3}{28}$
ii $\frac{23}{35}$

page 949 **ANSWERS EXERCISE 25A 3 a**, should read:

3 **a** $X = 0, 1, 2, 3,$ or 4

page 951 **ANSWERS EXERCISE 25F.3 3 a**, should read:

3 **a**

x_i	0	1	2	3
p_i	$(1-p)^3$	$3p(1-p)^2$	$3p^2(1-p)$	p^3

page 951 **ANSWERS EXERCISE 25G 1 b**, should read:

1 **a** 1.5 **b** $p_x = \dfrac{(1.5)^x e^{-1.5}}{x!}$ for $x = 0, 1, 2, 3, 4, 5, 6, ...$

x	0	1	2	3	4	5	6
f	12	18	12	6	3	0	1
$52p_x$	11.6	17.4	13.1	6.5	2.4	0.7	0.2

The fit is excellent.

page 952 **ANSWERS REVIEW SET 25B 1**, should read:

1 **a** $k = \frac{8}{5}$ **b** 0.975 **c** 2.55 **d** ≈ 0.740