

## ERRATA

### MATHEMATICS FOR THE INTERNATIONAL STUDENT MATHEMATICS SL (3rd edition)

#### First edition - 2013 first reprint

page 26 **EXAMPLE 10**, solution should read:

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

page 59 **DOMAIN AND RANGE**, first line under the blue box should read:

The domain and range of a relation are often described using **interval notation**.

page 111 **LOGARITHMS IN BASE 10**, first blue box on page should read:

In fact, all positive numbers can be written in the form  $10^x$  by using logarithms in base 10.

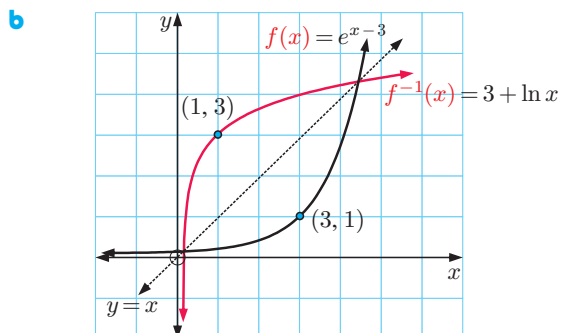
The **logarithm in base 10** of a positive number is the power that 10 must be raised to in order to obtain the number.

pages 116 and 117 **LAWS OF LOGARITHMS**, 1st proof should read:

**Proof:**

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page 128 **EXAMPLE 25**, part **b** solution should read:



page 350 **RATES OF CHANGE**, should read:

- Michael Jordan's average basketball scoring rate was 30.1 *points per game*.

page 354 **INVESTIGATION 4**, should read:

### INVESTIGATION 4

### GRADIENT FUNCTIONS

The software on the CD can be used to find the gradient of the tangent to a function  $f(x)$  at any point. By sliding the point along the graph we can observe the changing gradient of the tangent. We can hence generate the gradient function  $f'(x)$ .

page 377 **EXAMPLE 12**, solution to **b** should read:

**b**

$$\begin{aligned}y &= \ln \left[ \frac{x^2}{(x+2)(x-3)} \right] \\&= \ln x^2 - \ln[(x+2)(x-3)] && \{ \ln\left(\frac{a}{b}\right) = \ln a - \ln b \} \\&= 2 \ln x - [\ln(x+2) + \ln(x-3)] \\&= 2 \ln x - \ln(x+2) - \ln(x-3) \\ \therefore \frac{dy}{dx} &= \frac{2}{x} - \frac{1}{x+2} - \frac{1}{x-3}\end{aligned}$$

page 399 **EXAMPLE 12**, question should read:

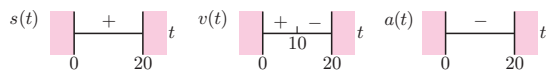
Find the exact position and nature of the stationary point of  $y = (x-2)e^{-x}$ .

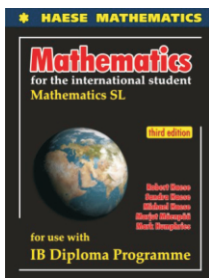
page 718 **ANSWERS REVIEW SET 14A**

- 4 a**  $f'(t) = -9.6t \text{ ms}^{-1}$   
**b**  $-19.2 \text{ ms}^{-1}$  (the  $-$  sign indicates travelling downwards)

page 725 **ANSWERS EXERCISE 17A.2** Sign diagrams should note the maximum of  $t$ :

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





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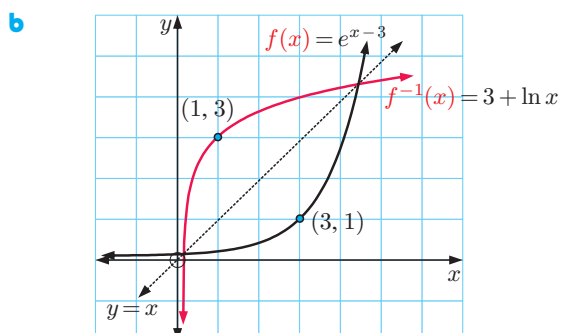
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page 123 **EXAMPLE 18**, should read:

Consider the equation  $2^x = 30$ .

- a** Solve for  $x$ , giving an exact answer, by using: **i** base 2 **ii** base 10.  
**b** Comment on your answers.

page 128 **EXAMPLE 25**, part **b** solution should read:



page 268 **INVESTIGATION**, Question **3 b** should read:

**b** Use  $\triangle ANP$  and the lengths in **a** to show that:

page 341 **REVIEW SET 13B**, Question **2 a ii** should read:

**ii** the velocity vector of the yacht

page 350 **RATES OF CHANGE**, should read:

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page 354 **INVESTIGATION 4**, should read:

## INVESTIGATION 4

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page 399 **EXAMPLE 12**, question should read:

Find the exact position and nature of the stationary point of  $y = (x-2)e^{-x}$ .

page 433 **EXERCISE 17C**

- 13 a** Show that the volume of the container is given by  $V(x) = x(36 - 2x)^2 \text{ cm}^3$ .

page 434 **EXERCISE 17C**

- 18 c** For what value of  $\theta$  does the gutter have maximum carrying capacity? Find the cross-sectional area for this value of  $\theta$ .
- 20** At 1:00 pm a ship A leaves port P. It sails in the direction  $30^\circ$  east of north at  $12 \text{ km h}^{-1}$ . At the same time, ship B is 100 km due east of P, and is sailing at  $8 \text{ km h}^{-1}$  towards P.

page 458 **EXERCISE 18E RULES FOR INTEGRATION** Last formula before the table should read:

$$\frac{d}{dx}(-\cos x + c) = \sin x$$

page 510 **EXERCISE 20B** Line 1 of question **1** should read:

- 1** For each of the following data sets, find the: **i** mean **ii** median **iii** mode.

page 627 **REVIEW SET 23B** Question **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:
- a**  $k$  **b**  $P(X \geq 1)$  **c**  $E(X)$ .

\*Disregard Question **1d**

page 670 **EXERCISE 25B** Question **33 a** should read:

- 33** Let  $f(x) = \frac{1}{x}$ ,  $x \neq 0$ .
- a** The graph  $y = f(x)$  and the line  $y = x + 2$  intersect at  $x = m \pm \sqrt{n}$  where  $m, n \in \mathbb{Z}$ . Find  $m$  and  $n$ .

page 681 **ANSWERS EXERCISE 1E**

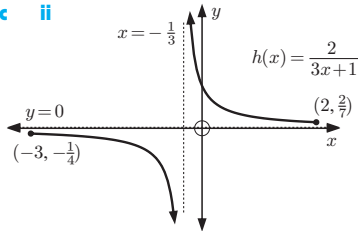
- 2 a (0.59, 5.59) and (3.41, 8.41)    b (3, -4) touching  
 c graphs do not meet    d (-2.56, -18.81) and (1.56, 1.81)
- 3 d    i (-4, -1) and (1, 4)    ii  $x < -4$  or  $0 < x < 1$

page 681 **ANSWERS EXERCISE 1F**

15 a  $y = -\frac{8}{9}x^2 + 8$

page 686 **ANSWERS REVIEW SET 2B**

- 7 c ii



- 9 c    i  $x \approx 1.83$     ii  $x = -3$

page 688 **ANSWERS EXERCISE 3F**

- 6 d    iii  $y \approx 2.62$

page 691 **ANSWERS EXERCISE 4G**

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

page 692 **ANSWERS EXERCISE 4H**

- 5 9 years

page 693 **ANSWERS EXERCISE 5A**

- 1 a    i  $x$ -intercepts -3, 0, and 4,  $y$ -intercept 0  
 c    iii horizontal asymptote of  $y = 0$

page 694 **ANSWERS EXERCISE 5A**

- d    iii vertical asymptote of  $x = -2$ ,  
 horizontal asymptote of  $y = -1$   
 iv Domain =  $\{x \mid -5 \leq x \leq 5, x \neq 2\}$ ,  
 Range =  $\{y \mid y < -1, -1 < y \leq 0.333\}$

page 702 **ANSWERS EXERCISE 7C**

- 3 a  $T_{r+1} = \binom{7}{r} x^{7-r} b^r$     b  $b = -2$

page 702 **ANSWERS EXERCISE 8B**

- 1 a 49.5 cm, 223 cm<sup>2</sup>    b 23.0 cm, 56.8 cm<sup>2</sup>

page 703 **ANSWERS EXERCISE 8C**

9 a

$\theta^\circ$	$\sin \theta$	$\sin(-\theta)$	$\cos \theta$	$\cos(-\theta)$
0.75	0.682	-0.682	0.732	0.732
1.772	0.980	-0.980	-0.200	-0.200
3.414	-0.269	0.269	-0.963	-0.963
6.25	-0.0332	0.0332	0.999	0.999
-1.17	-0.921	0.921	0.390	0.390

page 703 **ANSWERS EXERCISE 8D.2**

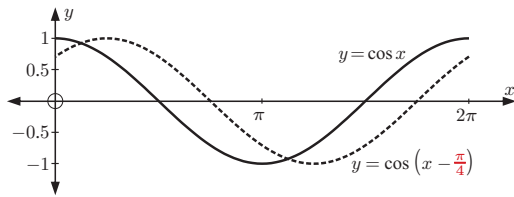
- 2 b  $\theta = 0, \pi$ , or  $2\pi$

page 704 **ANSWERS EXERCISE 9B**

- 7 a  $\theta \approx 75.2^\circ$

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

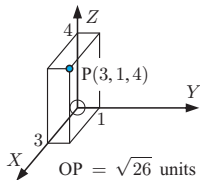
4 b



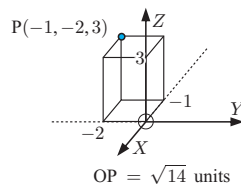
- 3 f  $-2\pi \leq -x \leq 0$

- 4 c  $x \approx 0.612, 3.75, 6.90$

2 c



d



- 2 a  $1.34 \text{ m s}^{-1}$  in the direction  $26.6^\circ$  to the left of intended line  
 b i  $30^\circ$  to the right of Q    ii  $1.04 \text{ m s}^{-1}$   
 3 a  $24.6 \text{ km h}^{-1}$     b  $\approx 9.93^\circ$  east of south  
 4 a  $82.5 \text{ m}$     b  $23.3^\circ$  to the left of straight across    c  $48.4 \text{ s}$   
 5 a The plane's speed in still air would be  $\approx 437 \text{ km h}^{-1}$ .  
 The wind slows the plane down to  $400 \text{ km h}^{-1}$ .  
 b  $4.64^\circ$  north of due east

- 1 b iii  $5x + 2y = 29$

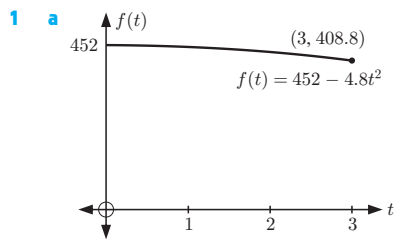
- 5 b ii  $x = t, y = 1 + t, z = 2 - 2t, t \in \mathbb{R}$

- 1  $75.7^\circ$     2  $\mathbf{b}_1 \cdot \mathbf{b}_2 = 0$     3  $75.5^\circ$

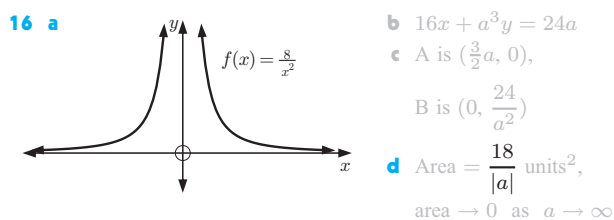
- 3 c  $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ 2 \end{pmatrix} + s \begin{pmatrix} 4 \\ 10 \end{pmatrix}, s \in \mathbb{R}$

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

- 5 a  $|\vec{AB}| = \sqrt{27}$  units



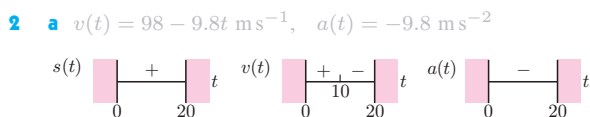
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 b  $-19.2 \text{ m s}^{-1}$  (the  $-$  sign indicates travelling downwards)



- 6 b increasing for  $x \leq 0$ , decreasing for  $x \geq 0$

- 8 c normal has equation  
 $y = -ex + 1 + e^2$

- 7 a local minimum at  $(0, 1)$     b as  $x \rightarrow \infty, f(x) \rightarrow \infty$   
 c  $f''(x) = e^x, \leftarrow + \rightarrow x$  thus  $f(x)$  is concave up for all  $x$ .



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

- 1 c  $3e^x - \ln|x| + c$     d  $\frac{2}{5}x^{\frac{5}{2}} - 2\ln|x| + c$   
 e  $-2x^{-\frac{1}{2}} + 4\ln|x| + c$     f  $\frac{1}{8}x^4 - \frac{1}{5}x^5 + \frac{3}{4}x^{\frac{4}{3}} + c$   
 g  $\frac{1}{3}x^3 + 3\ln|x| + c$     h  $\frac{1}{2}\ln|x| + \frac{1}{3}x^3 - e^x + c$   
 i  $5e^x + \frac{1}{12}x^4 - 4\ln|x| + c$

- 3 f  $\frac{1}{2}x^2 + x - 3\ln|x| + c$

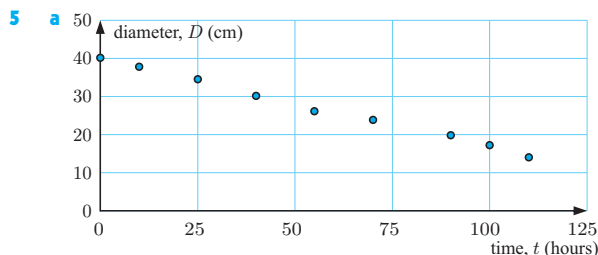
- 2 c  $\frac{1}{8(1-x^2)^4} + c$     d  $\frac{2}{3}(x^3+x)^{\frac{3}{2}} + c$

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

- 8 b positively skewed c i 0 ii 0.873 iii 0

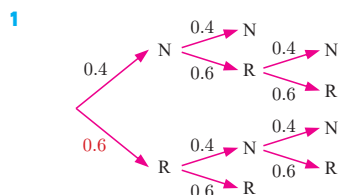
page 739 ANSWERS EXERCISE 21E

- 3 b  $r \approx -0.868$  c  $y \approx -12.7x + 116$   
 d gradient  $\approx -12.7$ . For each extra hour spent on homemade meals, a family spends about \$12.70 less each week on fast food.  
 $y$ -intercept  $\approx 116$  If no time is spent on homemade meals, a family will spend \$116 each week on fast food.
- 4 d gradient  $\approx 5.98$   
 Every year a child grows about 5.98 cm taller.  
 e 200 cm - This prediction is not very reliable, as it is an extrapolation well beyond the upper pole. Most children have finished growing taller before 20 years.



- 7 f i  $\approx 135$  mg ii  $\approx 76.0$  mg

page 744 ANSWERS REVIEW SET 22B



page 744 ANSWERS EXERCISE 23A

- 2 c i  $X$  = number of times the switch is turned on/off before it fails  
 ii any integer  $\geq 1$  iii discrete

page 745 ANSWERS EXERCISE 23A

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

page 745 ANSWERS EXERCISE 23B

- 8 a  $P(X = 0) = 0.665$  b  $P(X \geq 1) = 0.335$

page 746 ANSWERS EXERCISE 23D.3

- 1 a i  $\mu = 3, \sigma \approx 1.22$   
 b i  $\mu = 1.2, \sigma \approx 0.980$   
 c i  $\mu = 4.8, \sigma \approx 0.980$
- 2  $\mu = 5, \sigma^2 = 2.5$
- 3 a  $\mu = 1.2, \sigma \approx 1.07$  b  $\mu = 28.8, \sigma \approx 1.07$

page 747 ANSWERS REVIEW SET 23B

- 1 a  $k = \frac{8}{5}$  b 0.975 c 2.55 \*Disregard question d

page 747 ANSWERS REVIEW SET 23C

- 2 b  $\mu = 2$  c  $\sigma = 1$

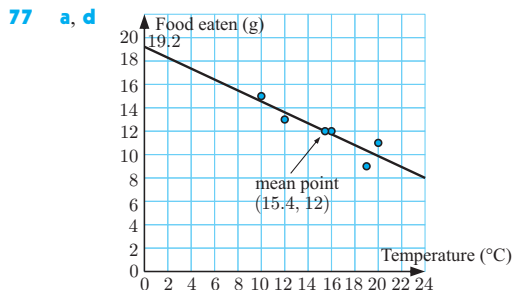
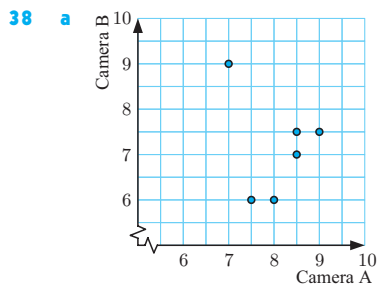
page 748 ANSWERS REVIEW SET 24C

- 3 0.207 4  $\mu \approx 80.0$  cm 5 0.0708 units<sup>2</sup>

page 748 ANSWERS EXERCISE 25A

- 3 a  $b^2x$  b  $2 \ln b + x$  c  $x^* = \frac{2 \ln b}{b^2 - 1}$

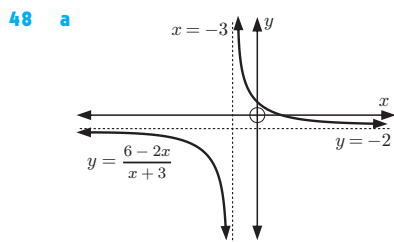




**89 a**

$x$	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	$\pi$	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	$2\pi$
$f(x)$	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0	$\frac{1}{2}$	1	$\frac{1}{2}$	0

**18 c**  $y \approx 1.64x - 0.820$       **d** P(0.903, 0.671)



**b** as  $x \rightarrow -3^-$ ,  $y \rightarrow -\infty$   
 as  $x \rightarrow -3^+$ ,  $y \rightarrow \infty$   
 as  $x \rightarrow \infty$ ,  $y \rightarrow -2^+$   
 as  $x \rightarrow -\infty$ ,  $y \rightarrow -2^-$   
 VA is  $x = -3$ , HA is  $y = -2$

