

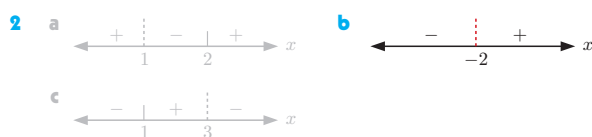
ERRATA

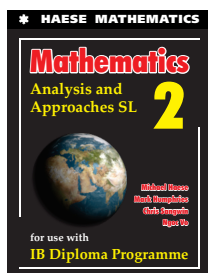
Mathematics: Analysis and Approaches SL

First edition - 2024 fourth reprint

The following erratum was made on 28/Oct/2024

page 541 **ANSWERS EXERCISE 3D.2**, question **2 b** should read:





ERRATA

Mathematics: Analysis and Approaches SL

First edition - 2022 third reprint

The following erratum was made on 27/Aug/2024

page 287 CHAPTER 12 INVESTIGATION 1, question 1 should read:

$$\begin{aligned} \mathbf{1} \quad \text{Use the binomial expansion} \quad (x+h)^n &= \sum_{r=0}^n \binom{n}{r} x^{n-r} h^r \\ &= \binom{n}{0} x^n + \binom{n}{1} x^{n-1} h + \binom{n}{2} x^{n-2} h^2 + \dots + \binom{n}{n} h^n \end{aligned}$$

and the first principles formula $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ to find the derivative of $f(x) = x^n$ for $n \in \mathbb{N}$.

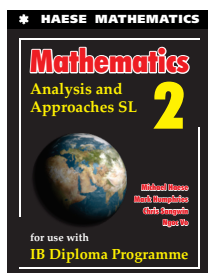
The following errata were made on 14/Oct/2022

page 562 ANSWERS EXERCISE 7C, question 7 should read:

6 B and D **7** A and C, B and E

page 563 ANSWERS REVIEW SET 7B, question 5 should read:

5 $\approx 103^\circ$ or 257° **6** radius ≈ 8.79 cm, area ≈ 81.0 cm²



ERRATA

Mathematics: Analysis and Approaches SL

First edition - 2020 first reprint

The following erratum was made on 27/Jul/2020

page 606 **ANSWERS EXERCISE 21A.1**, question **2 c** should read:

- 2 c** The times may be affected by:
- weather conditions
 - walking speed
 - physical fitness
 - traffic.

The following erratum was made on 17/Jun/2020

page 139 **CHAPTER 5 INVESTIGATION 2**, question **5** should read:

- 5** For continuous growth, $u_n = u_0 e^{rt}$ where u_0 is the initial amount, r is the annual percentage rate, and t is the number of years.
- Use this formula to find the final amount if \$1000 is invested for **1 year** at a fixed rate of 6% per annum, where the interest is paid continuously.

The following errata were made on 27/May/2020

page 601 **ANSWERS EXERCISE 19D**, question **3 b** should read:

- 3 a** $r \approx -0.924$
- b** There is a strong, **negative correlation** between the *petrol price* and the *number of customers*.

page 608 **ANSWERS REVIEW SET 21B.2**, question **10 b** should read:

- 10 a** $\approx 84.1\%$ **b** ≈ 0.880

The following erratum was made on 13/May/2020

page 586 **ANSWERS REVIEW SET 13B**, question **20 b** should read:

- 20 a** $0 \leq x \leq \frac{\pi}{2}$ and $\frac{3\pi}{2} \leq x \leq 2\pi$
- b** $f'(x) = -\frac{\sin x}{2\sqrt{\cos x}}$, increasing for $\frac{3\pi}{2} \leq x \leq 2\pi$,
decreasing for $0 \leq x \leq \frac{\pi}{2}$

The following errata were made on 11/May/2020

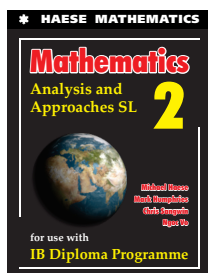
page 585 ANSWERS REVIEW SET 13A, question 19 c should read:

- 19 a concave up for $x \geq \frac{4}{3}$, concave down for $x \leq \frac{4}{3}$
b concave up for $x \leq -3$,
concave down for $-3 \leq x < 0$ and $x > 0$
c concave up for $-4 < x \leq -2$ and $x > 0$,
concave down for $x < -4$ and $-2 \leq x < 0$

page 588 ANSWERS EXERCISE 15B, question 1 b should read:

1 b

n	A_L	A_U
5	0.5497	0.7497
10	0.6105	0.7105
50	0.6561	0.6761
100	0.6615	0.6715
500	0.6656	0.6676



ERRATA

Mathematics: Analysis and Approaches SL

First edition - 2019 initial print

The following erratum was made on 30/Mar/2020

page 207 SECTION 8C, blue box should read:

For the general sine function

$$y = a \sin(b(x - c)) + d \quad \text{where } b > 0:$$

affects
amplitude

affects
period

affects
horizontal translation

affects
vertical translation

- the amplitude is $|a|$
- the period is $\frac{2\pi}{b}$
- the principal axis is $y = d$
- $y = a \sin(b(x - c)) + d$ is obtained from $y = \sin x$ by a vertical stretch with scale factor $|a|$ and a horizontal stretch with scale factor $\frac{1}{b}$, a reflection in the x -axis if $a < 0$, and a translation through $\begin{pmatrix} c \\ d \end{pmatrix}$.

The following errata were made on 13/Mar/2020

page 42 SECTION 2C Example 10, solution to part **b** should read:

a The graph cuts the x -axis twice if $\Delta > 0$.
 $\therefore 36 - 4k > 0$
 $\therefore 4k < 36$
 $\therefore k < 9$

b The graph touches the x -axis if $\Delta = 0$.
 $\therefore 36 - 4k = 0$
 $\therefore k = 9$

c The graph does not cut the x -axis if $\Delta < 0$.
 $\therefore 36 - 4k < 0$
 $\therefore 4k > 36$
 $\therefore k > 9$

page 150 EXERCISE 6B, question 6 should read:

6 Suppose $\log_a b = x$, $b \neq 1$, $b > 0$. Find, in terms of x , the value of $\log_b a$.

page 209 EXERCISE 8C, question 14 should read:

14 Consider the general sine function $y = a \sin(b(x - c)) + d$, with default values $a, b = 1$, $c, d = 0$. State which of the variables a, b, c , and d can be changed to produce a change in:

a the x -intercepts of the function

b the y -intercept of the function

c the range of the function.

page 296 EXERCISE 12C, question 7 should read:

7 Find the value of x for which the tangent to $f(x) = ax\sqrt{1-x}$, $a \neq 0$ has gradient:

page 340 **REVIEW SET 13A**, question **4** was a duplicate of Review Set 12A Question 7, change to:

- 4** Find all points on the curve $y = 4x^3 + 6x^2 - 13x + 1$ where the gradient of the tangent is 11.

page 415 **CHAPTER 17 ACTIVITY 1**, question **2 a** change to match example diagram:

- 2** Consider the total area enclosed between $y = -x^3 + x^2 + 6x$ and $y = 2x + 4$ on the interval $-2 \leq x \leq 2$.

- a** Explain why the total area is equal to

$$\int_{-2}^2 |(-x^3 + x^2 + 6x) - (2x + 4)| dx = \int_{-2}^2 |-x^3 + x^2 + 4x - 4| dx$$

page 495 **CHAPTER 20 INVESTIGATION 1**, question **1** change for simplicity:

What to do:

- 1** Click on the icon to access the demonstration. It shows the graph of the binomial distribution for $X \sim B(n, p)$. Set $n = 25$ and $p = 0.1$.
- a** What is the mode of X ?
- b** Describe the shape of the distribution.

page 503 **REVIEW SET 20B**, remove question **9 c ii**:

page 535 **ANSWERS EXERCISE 2C**, questions **6 b i**, and **c i** should read:

- 6 a**
- | | | |
|-----------------------------------|-----------------------|------------------------|
| i $k < \frac{9}{4}$ | ii $k = \frac{9}{4}$ | iii $k > \frac{9}{4}$ |
| b i $k < 4, k \neq 0$ | ii $k = 4$ | iii $k > 4$ |
| c i $k > -\frac{4}{3}, k \neq -1$ | ii $k = -\frac{4}{3}$ | iii $k < -\frac{4}{3}$ |

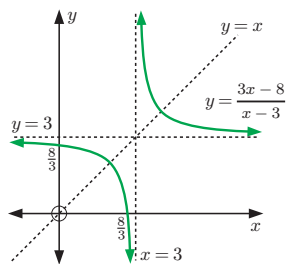
page 538 **ANSWERS EXERCISE 3A**, question **6 a** should read:

- 6 a** $y^2 = x$ is a relation but not a function.
 $y = x^2$ is a function (and a relation).
 $y^2 = x$ has a horizontal axis of symmetry (the x -axis).
 $y = x^2$ has a vertical axis of symmetry (the y -axis).
Both $y^2 = x$ and $y = x^2$ pass through $(0, 0)$ and $(1, 1)$.
 $y^2 = x$ is a rotation of $y = x^2$ clockwise through 90° about the origin or $y^2 = x$ is a reflection of $y = x^2$ in the line $y = x$.

page 542 **ANSWERS EXERCISE 3D.2**, question **5** should read:

- 5 a** Domain is $\{x \mid x \neq -\frac{d}{c}\}$
- b** vertical asymptote is $x = -\frac{d}{c}$
- c** x -intercept is $-\frac{b}{a}, a \neq 0$, y -intercept is $\frac{b}{d}, d \neq 0$
- d** $\frac{ax+b}{cx+d} = \frac{\frac{a}{c}(cx+d) - \frac{ad}{c} + b}{cx+d}$ and so on
- As $|x| \rightarrow \infty, \frac{b - \frac{ad}{c}}{cx+d} \rightarrow 0$.
- $\therefore$ the horizontal asymptote is $y = \frac{a}{c}$.

15 a



$y = \frac{3x-8}{x-3}$ is symmetrical about $y = x$

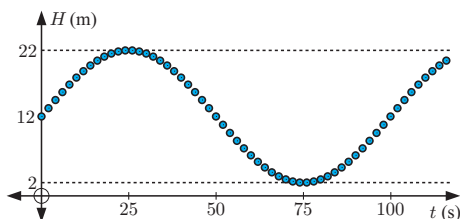
$$\therefore f^{-1}(x) = \frac{3x-8}{x-3} = f(x)$$

b $f^{-1}(x) = \frac{3x-8}{x-3}$

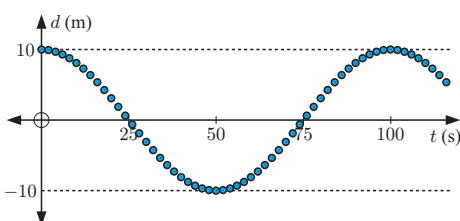
- 9 a** The graph is stretched vertically with scale factor $|a|$, and reflected in the x -axis. It is then translated h units horizontally and k units vertically.
- b** The function has shape  after it is reflected in the x -axis. The function has vertex (h, k) , and y -intercept $ah^2 + k$.

14 a b, c, d **b** c, d **c** a, d

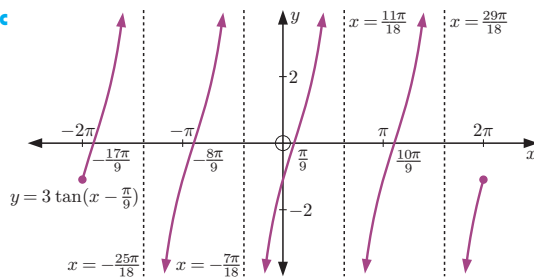
7 a



b



4 c



- 14 c** Using technology,
 $T \approx 36.5 \sin(0.009\,01n - 0.0903) - 43.2$.
 Our model fits the data well.

page 570 **ANSWERS REVIEW SET 8B**, question **14 c** should read:

- 14 c** Using technology, $T \approx 7.20 \sin(0.488t + 1.08) + 24.7$.
The model fits reasonably well but not perfectly.

page 571 **ANSWERS EXERCISE 9C.2**, questions **2 c** and **3 a** should read:

- 2 a** $1 + 2 \sin \theta + \sin^2 \theta$ **b** $\sin^2 \alpha - 4 \sin \alpha + 4$
c $\tan^2 \alpha - 2 \tan \alpha + 1$ **d** $1 + 2 \sin \alpha \cos \alpha$
e $1 - 2 \sin \beta \cos \beta$ **f** $-4 + 4 \cos \alpha - \cos^2 \alpha$
3 a $-\sin^2 x \tan^2 x$ **b** 13

page 572 **ANSWERS EXERCISE 10C**, questions **6 a** and **7 a** should read:

- 6 a** $(a - b)(a + b) = b(a - b) \nRightarrow a + b = b$
 $2a = a \nRightarrow 2 = 1$
b $\frac{4x - 40}{6 - x} = \frac{4x - 40}{13 - x} \nRightarrow 6 - x = 13 - x$
7 a $6x - 12 = 3(x - 2) \nRightarrow 6x - 12 + 3(x - 2) = 0$
b $x(x - 6) = 3(-3) \nRightarrow x = 3 \vee x - 6 = -3$

page 572 **ANSWERS REVIEW SET 10B**, question **4 b** should read:

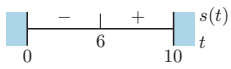
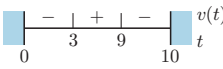
- 4 a** not equivalent **b** not equivalent

page 588 **ANSWERS EXERCISE 15B**, question **1 b** should read:

1 b

n	A_L	A_U
5	0.5497	0.7497
10	0.6105	0.7105
50	0.6561	0.6761
100	0.6615	0.6715
500	0.6657	0.6677

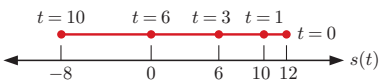
page 596 **ANSWERS EXERCISE 18B.1**, question **3 e** sign diagrams should terminate at $t = 10$:

- 3 a** 2 cm to the left of the origin **b** $t = 6$ s
c to the right **d** $t = 3$ s and $t = 9$ s
e i  **ii** 
f 1 cm s^{-1}

page 596 **ANSWERS EXERCISE 18C**, question **3 c** should read:

- 3 c** At $t = 5$ s, the stone is 367.5 m above the ground and moving upward at 49 m s^{-1} . It has acceleration -9.8 m s^{-2} .
At $t = 12$ s, the stone is 470.4 m above the ground and moving downward at 19.6 m s^{-1} . It has acceleration -9.8 m s^{-2} .

page 598 **ANSWERS REVIEW SET 18A**, question **1 e** motion diagram should have correctly placed point for $t = 6$:

- 1 a** 12 m to the right of the origin
b i 10 m to the right of the origin **c** $t = 6$ s
ii 6 m to the right of the origin
d No, the displacement function is linear, so it has no turning points.
e 

page 606 **ANSWERS REVIEW SET 20B**, question **9 c ii** was removed.

The following errata were made on 26/Jul/2019

page 296 **EXERCISE 12C**, question **7** should read:

- 7** Find the value of x for which the tangent to $f(x) = ax\sqrt{1-x}$, $a \neq 0$ has gradient:

page 371 **EXERCISE 15B**, question **2 a** should read:

- 2** Consider the region enclosed by $y = \sqrt{1+x^3}$ and the x -axis for $0 \leq x \leq 2$.
a Write expressions for the lower and upper rectangle sums using n subintervals where $n \in \mathbb{Z}^+$.

page 374 **EXERCISE 15C**, question **2 b** should read:

- b** Predict a general rule for the antiderivative of e^{kx} where $k \neq 0$ is a constant.

page 385 **CHAPTER 15 SECTION B**, text above blue box should read:

For $x < 0$, $\frac{d}{dx}(\ln(-x) + c) = \frac{-1}{-x} = \frac{1}{x}$

$$\therefore \int \frac{1}{x} dx = \begin{cases} \ln x + c & \text{if } x > 0 \\ \ln(-x) + c & \text{if } x < 0 \end{cases}$$

$$\therefore \int \frac{1}{x} dx = \ln |x| + c, \quad x \neq 0$$

$|x|$ is the absolute value of x , which was studied in **Chapter 3**.



page 390 **CHAPTER 16 SECTION D**, blue box should read:

$$\therefore \int (ax + b)^n dx = \frac{1}{a} \frac{(ax + b)^{n+1}}{(n+1)} + c \quad \text{for } n \neq -1, \quad a \neq 0.$$

page 417 **EXERCISE 17E**, question **4**, function $E(t)$ should read:

- 4** The rate of power consumption of the United Kingdom can be modelled by the function

$$E(t) = 13 \sin\left(\frac{(t+3)\pi}{3}\right) + 70 \cos\left(\frac{(t-1)\pi}{6}\right) + 196 \quad \text{TWh per month}$$

page 424 **REVIEW SET 17B**, question **19** should read:

- 19** Over the course of a day, the **rate** of solar energy being transferred into Callum's solar panels is given by

$$E(t) = 2 \sin\left(\frac{t-5}{5}\right) + \frac{1}{2} \sin\left(\frac{t-5}{4}\right) \quad \text{kW}$$

page 428 **CHAPTER 18 EXAMPLE 1**, solution to part **d** should read:

- d** The stone is above ground level whenever $s(t) > 0$.
This occurs for $0 \leq t < 5$ s.

page 447 **REVIEW SET 18B**, question **8**, function $v(t)$ should read:

- 8** A skier is travelling down a hill. Her velocity after t seconds is given by

$$v(t) = \frac{(t^{1.1} + 3t)^{1.5}}{10} \quad \text{ms}^{-1}.$$

page 461 **CHAPTER 19 SECTION C**, second paragraph of **INTERPOLATION AND EXTRAPOLATION** should read:

The **line of best fit** for the data is also drawn on the scatter diagram. We can use this line to predict the value of one variable for a given value of the other.

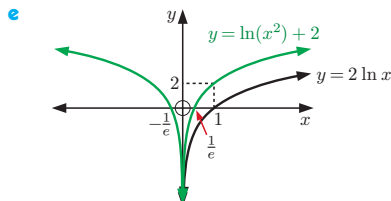
page 462 **CHAPTER 19 SECTION C**, should read:

For example, consider the **line of best fit** for the data in the **Opening Problem**. It can be used to predict the distance a discus will be thrown by an athlete of a particular age.

page 501 **REVIEW SET 20A**, question **8** should read:

- 8** Suppose X is the number of marsupials entering a park at night. It is suspected that X has a probability mass function $P(x) = a(x^2 - 8x)$ where $x = 0, 1, 2, 3, \dots, 8$.

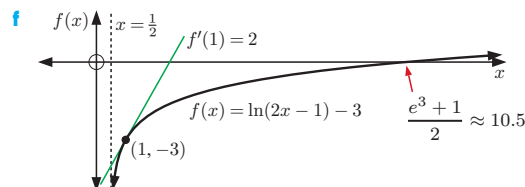
page 559 **ANSWERS EXERCISE 6H**, question **5 e** diagram should include $x < 0$:



page 574 **ANSWERS REVIEW SET 11A**, question **9 c i** and **ii** should be positive:

- 9 a i** 447.2 m **ii** 432.8 m **b** $f'(t) = -9.6t$
c i 9.6 m s^{-1} **ii** 19.2 m s^{-1}

page 581 **ANSWERS EXERCISE 13E**, question **5 f** diagram should include tangent at $(1, -3)$:



page 586 **ANSWERS REVIEW SET 13B**, question **20 b** should read:

- 20 a** $0 \leq x \leq \frac{\pi}{2}$ and $\frac{3\pi}{2} \leq x \leq 2\pi$
b $f'(x) = -\frac{\sin x}{2\sqrt{\cos x}}$, increasing for $\frac{3\pi}{2} < x \leq 2\pi$,
decreasing for $0 \leq x < \frac{\pi}{2}$

page 589 **ANSWERS EXERCISE 15C**, question **2 b** should read:

- 2 b** The antiderivative of e^{kx} is $\frac{1}{k}e^{kx}$, where $k \neq 0$ is a constant.

page 593 **ANSWERS EXERCISE 17C**, question **5** should read:

- 5** $k = \frac{3}{2}$ or 6

page 594 **ANSWERS EXERCISE 17E**, question **3 b** should be in units instead of units²:

- 3 a** C_1 is $y = 3 \sin \frac{\pi t}{10}$, C_2 is $y = \sin \frac{\pi t}{10}$ **b** $\frac{40}{\pi}$ units

page 599 **ANSWERS REVIEW SET 18B**, question **8 b** and **d** should read:

- 8 a** $\approx 6.76 \text{ m s}^{-1}$
b $a(t) = 0.15(t^{1.1} + 3t)^{0.5}(1.1t^{0.1} + 3) \text{ m s}^{-2}$
c $\approx 1.79 \text{ m s}^{-2}$ **d** $\approx 109 \text{ m}$