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 \( \approx 0.880 \)

The following erratum was made on 13/May/2020

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

20 a \( 0 \leq x \leq \frac{\pi}{4} \) 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 \( 0 \leq x \leq \frac{\pi}{4} \).
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 $x \geq \frac{1}{4}$, concave down for $x \leq \frac{1}{4}$
     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:

<table>
<thead>
<tr>
<th>n</th>
<th>$A_L$</th>
<th>$A_U$</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.5497</td>
<td>0.7497</td>
</tr>
<tr>
<td>10</td>
<td>0.6105</td>
<td>0.7105</td>
</tr>
<tr>
<td>50</td>
<td>0.6561</td>
<td>0.6761</td>
</tr>
<tr>
<td>100</td>
<td>0.6615</td>
<td>0.6715</td>
</tr>
<tr>
<td>500</td>
<td>0.6656</td>
<td>0.6676</td>
</tr>
</tbody>
</table>
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

\[ y = a \sin(b(x - c)) + d \]

where \( b > 0 \):

- 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 \((c,d)\).

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 \(\Delta > 0\).
\[ \therefore \quad 36 - 4k > 0 \]
\[ \therefore \quad 4k < 36 \]
\[ \therefore \quad k < 9 \]

\[ b \] The graph touches the \(x\)-axis if \(\Delta = 0\).
\[ \therefore \quad 36 - 4k = 0 \]
\[ \therefore \quad k = 9 \]

\[ c \] The graph does not cut the \(x\)-axis if \(\Delta < 0\).
\[ \therefore \quad 36 - 4k < 0 \]
\[ \therefore \quad 4k > 36 \]
\[ \therefore \quad k > 9 \]

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 \(f(x) = ax\sqrt{1-x}, \quad a \neq 0\) has gradient:
4 Find all points on the curve \( y = 4x^3 + 6x^2 - 13x + 1 \) where the gradient of the tangent is 11.

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
\[
\int_{-2}^{2} \left( -x^3 + x^2 + 6x \right) - \left( 2x + 4 \right) \, dx = \int_{-2}^{2} -x^3 + x^2 + 4x - 4 \, dx
\]

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.

6 a \( y^2 = x \) is a relation but not a function.

b \( y = x^2 \) is a function (and a relation).

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 \( y = x \).

a Domain is \( \{ x \mid x \neq -\frac{d}{c} \} \)

b vertical asymptote is \( x = -\frac{d}{c} \)

c \( x \)-intercept is \( \frac{b}{a} \neq 0 \), \( y \)-intercept is \( \frac{b}{d} \), \( d \neq 0 \)

d \( \frac{ax + b}{cx + d} = \frac{a(cx + d) - ad}{cx + d} + \frac{b}{cx + d} \) and so on

As \( |x| \to \infty \), \( \frac{b-ad}{cx+d} \to 0 \).

\( \therefore \) the horizontal asymptote is \( y = \frac{a}{c} \).
**page 543 ANSWERS EXERCISE 3C**, question 15 should read:

\[ y = 3x - 8 \quad \text{is symmetrical about} \quad y = x \]

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

\[ \text{b} \quad f^{-1}(x) = \frac{3x - 8}{x - 3} \]

**page 550 ANSWERS EXERCISE 3C**, question 9 should read:

\[ \text{a} \quad \text{The graph is stretched vertically with scale factor} \ |a|, \text{and reflected in the} \ x\text{-axis. It is then translated} \ h \text{units horizontally and} \ k \text{units vertically.} \]

\[ \text{b} \quad \text{The function has shape} \ \updownarrow \text{after it is reflected in the} \ x\text{-axis.} \]

\[ \text{The function has vertex} \ (h, k), \text{and} y\text{-intercept} \ ah^2 + k. \]

**page 566 ANSWERS EXERCISE 8C**, question 14 should read:

\[ \text{a, b, c, d} \quad \text{b, c, d} \quad \text{c, a, d} \]

**page 566 ANSWERS EXERCISE 8D.1**, question 7 graphs should be discrete:

**page 567 ANSWERS EXERCISE 8E**, question 4 c should not have y intercept label of −1:

**page 569 ANSWERS REVIEW SET 8A**, question 14 e should read:

\[ T \approx 36.5 \sin(0.00901t - 0.0903) - 43.2. \]

Our model fits the data well.
Using technology, \( T \approx 7.20 \sin(0.488t + 1.08) + 24.7 \).

The model fits reasonably well but not perfectly.

\[ a = \sin^2 \theta + \sin^2 \alpha \]
\[ b = 1 + 2 \sin \alpha \cos \alpha \]
\[ c = 1 - 2 \sin \beta \cos \beta \]
\[ d = 1 + 2 \sin \alpha \cos \alpha \]
\[ e = -1 \sin^2 x \tan^2 x \]
\[ f = -4 + 4 \cos \alpha - \cos^2 \alpha \]

No, the displacement function is linear, so it has no turning points.

\( 0 - 8 \) \( s(t) \)
\( t = 1 \)
\( t = 0 \)
\( t = 3 \)
\( t = 6 \)

\( 6 \) \( \) \( 10 \)
\( 0 \)
\( 1 \)
\( 3 \)
\( 6 \)
\( 9 \)

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\(^{-2}\).
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 \( x < 0 \), \( \frac{d}{dx}(\ln(-x) + c) = -\frac{1}{-x} = \frac{1}{x} \)

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

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

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

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

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

\[ v(t) = \frac{(t^{1.1} + 3t)^{1.5}}{10} \quad \text{m s}^{-1}. \]

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.
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.

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 $x = 0, 1, 2, 3, \ldots, 8$.

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

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