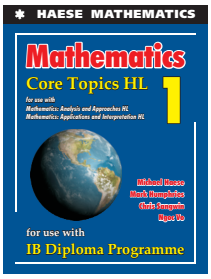


ERRATA

Mathematics: Core Topics HL

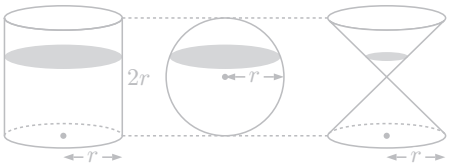
First edition - 2024 fourth reprint

The following erratum was made on 28/Oct/2024

page 146 **SECTION 6C INVESTIGATION 2, VOLUME FORMULAE** Question **7 b**, should read:

7 Archimedes used a different idea to find the formula for the volume of a sphere. The following is not exactly what he did, but is very much in the same spirit.

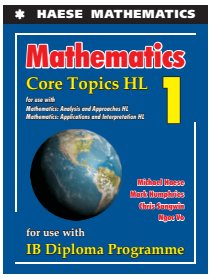
Consider the cylinder, sphere, and double cone alongside.



a Show that if *any* horizontal slice of the three solids is made, the sum of the areas from the sphere and the double cone equals the area from the cylinder.

b Explain why the sum of the volumes of the sphere and double cone equals the volume of the cylinder.

c Use the known volume of a cylinder and cone formulae to find the volume of the sphere.



ERRATA

Mathematics: Core Topics HL

First edition - 2021 second reprint

The following errata were made on 14/Oct/2022

page 496 **ANSWERS EXERCISE 5E.3** Question **4 a**, should read:

4 **a** Real interest rate $= \frac{1.005}{1.001} \approx 1.003\,996 \approx 0.4\%$

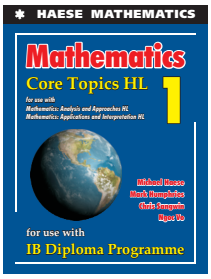
b \$6602.66

page 501 **ANSWERS EXERCISE 8C** Question **8**, should read:

7 **B** and **D** **8** **A** and **C**, **B** and **E**

page 502 **ANSWERS REVIEW SET 8B** Question **3**, should read:

2 ≈ 111 cm^2 **3** $\approx 103°$ or $257°$



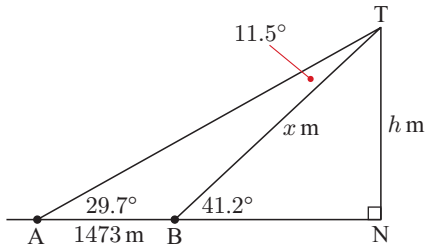
ERRATA

Mathematics: Core Topics HL

First edition - 2020 first reprint

The following erratum was made on 29/Apr/2020

page 222 **SECTION 9D Example 8**, second line of solution should read:



Let BT be x m and NT be h m.

$\widehat{\text{ATB}} = 41.2° - 29.7°$ {exterior angle of $\triangle$ABT}

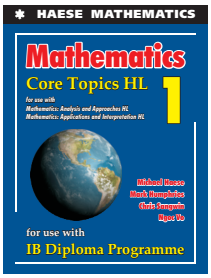
$= 11.5°$

We find x in $\triangle$ABT using the sine rule:

$$\frac{x}{\sin 29.7°} = \frac{1473}{\sin 11.5°}$$

$$\therefore \quad x = \frac{1473}{\sin 11.5°} \times \sin 29.7°$$

$$\approx 3660.62$$



ERRATA

Mathematics: Core Topics HL

First edition - 2019 initial print

The following errata were made on 30/Mar/2020

page 455 **SECTION 17C**, blue box should read:

For the **general sine function**

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

affects	affects	affects	affects
amplitude	**period**	**horizontal translation**	**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 $\begin{pmatrix} c \\ d \end{pmatrix}$.

page 499 **ANSWERS EXERCISE 6D** Question **10**, should read:

10 **a** $\approx 111\,000$ mm^2
b The external surface area and internal surface area of a container may be different.
c **i** $\approx 1\,860\,000$ mm^3 **ii** ≈ 1.86 L **iii** $\approx 502\,000$ mm^3

page 504 **ANSWERS EXERCISE 10B** Question **9 b** and **c**, should read:

9 **a** D$(-4, -2, 2)$ **b** ≈ 14.8 units **c** ≈ 168 units^3

page 507 **ANSWERS EXERCISE 11K** Question **5**, should read:

3 $\frac{10}{13}$ **4** ≈ 0.424 **5** ≈ 0.0137 **6** $\frac{15}{83}$ **7** $\frac{99}{148}$

page 516 **ANSWERS REVIEW SET 13A** Question **8 d**, should read:

8 **a** 101.5 **b** 7.5 **c** 100.2 **d** $\sigma \approx 7.59$, $s \approx 7.78$

page 517 **ANSWERS REVIEW SET 13B** Question **11 b iv**, should read:

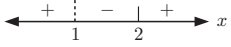
11 **b** **i** median ≈ 26 **ii** IQR ≈ 12
iii $\overline{x} \approx 26.0$ **iv** $\sigma \approx 8.31$, $s \approx 8.38$

page 523 **ANSWERS EXERCISE 15A** Question **7 a**, should read:

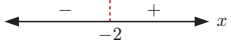
7 **a** $y^2 = x$ is a relation but not a function.
$y = x^2$ is a function (and a relation).
$y^2 = x$ has a horizontal axis of symmetry (the x-axis).
$y = x^2$ has a vertical axis of symmetry (the y-axis).
Both $y^2 = x$ and $y = x^2$ pass through $(0, 0)$ and $(1, 1)$.
$y^2 = x$ is a rotation of $y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

page 525 **ANSWERS EXERCISE 15D.2** Question **2 b**, diagram should be:

2 **a**



b



page 528 **ANSWERS EXERCISE 15F** Question **11 c**, should have parts labelled correctly and read:

11 **a** The inverse function must also be a function and must therefore satisfy the vertical line test, which it can only do if the original function satisfies the horizontal line test.
b **i** is the only one.
c **ii** Domain is $\{x \mid x \geqslant 1\}$ or $\{x \mid x \leqslant 1\}$
iii Domain is $\{x \mid x \geqslant 1\}$ or $\{x \mid -2 \leqslant x \leqslant 1\}$ or $\{x \mid x \leqslant -2\}$

The following errata were made on 04/Dec/2019

page 9 **TABLE OF CONTENTS** Section **17E**, should not be shaded green:

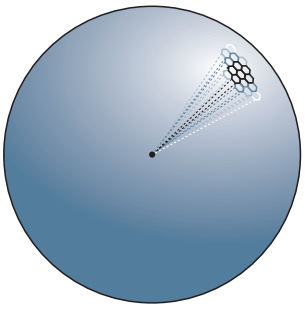
The relevant *Mathematics: Applications and Interpretation* syllabus references are:
SL 2.6, (AI)AHL 2.9, and **(AI)AHL 4.13**

page 146 **SECTION 6C INVESTIGATION 2, VOLUME FORMULA** Question **8 a**, should read:

8 Now suppose we approximate a sphere with radius r using a large number n of tapered solids, each with height r and their apex at the centre of the sphere. Suppose the kth solid has base area A_k.

a Explain why $\sum_{k=1}^{n} \frac{1}{3} A_k r \approx \frac{4}{3}\pi r^3$.

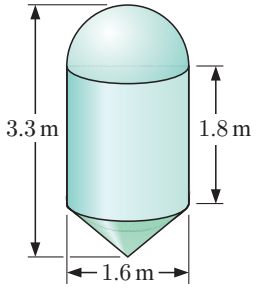
b Hence explain why the surface area of a sphere is given by $A = 4\pi r^2$.



page 155 **REVIEW SET 6A** Question **11**, should disregard thickness of sheet steel:

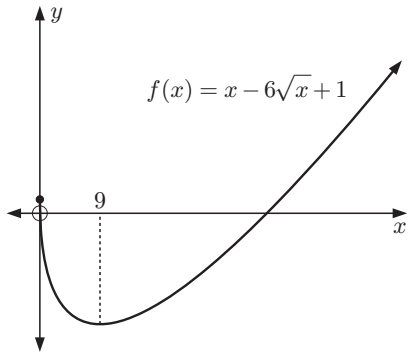
11 A feed silo is made out of sheet steel using a hemisphere, a cylinder, and a cone.

a Explain why the height of the cone must be 70 cm.
b Hence find the *slant height* of the conical section.
c Calculate the total amount of steel used.
d Show that the silo can hold about 5.2 cubic metres of grain.
e Write the capacity of the silo in kL.



page 420 **EXERCISE 15F** Question **22 c i**, 4 is not in the domain of $g^{-1}(x)$, change question to read:

22 The graph of $f(x) = x - 6\sqrt{x} + 1$ is shown alongside.



a State the natural domain of $f(x)$.

b Does $f(x)$ have an inverse function? Explain your answer.

c Let $g(x) = x - 6\sqrt{x} + 1$, $0 \leqslant x \leqslant 9$.

i Find $g^{-1}(x)$, and verify that $(g \circ g^{-1})(0) = 0$.

ii State the domain and range of g and g^{-1}.

d Let $h(x) = x - 6\sqrt{x} + 1$, $x \geqslant 9$.

i Find $h^{-1}(x)$ and verify that $(h \circ h^{-1})(16) = 16$.

ii State the domain and range of h and h^{-1}.

iii Find the value of x such that $g^{-1}(x) = h^{-1}(x)$.

page 442 **SECTION 16E**, blue box should read:

From the **Investigation**, you should have observed that:

- zeros of $y = f(x)$ become vertical asymptotes of $y = \dfrac{1}{f(x)}$
- vertical asymptotes of $y = f(x)$ become zeros of $y = \dfrac{1}{f(x)}$
- local maxima of $y = f(x)$, $f(x) \neq 0$ correspond to local minima of $y = \dfrac{1}{f(x)}$
- local minima of $y = f(x)$, $f(x) \neq 0$ correspond to local maxima of $y = \dfrac{1}{f(x)}$
- when $f(x) > 0$, $\dfrac{1}{f(x)} > 0$ and when $f(x) < 0$, $\dfrac{1}{f(x)} < 0$
- when $f(x) \to 0$, $\dfrac{1}{f(x)} \to \pm\infty$ and when $f(x) \to \pm\infty$, $\dfrac{1}{f(x)} \to 0$.

pages 461-463, 478, and 481 **SECTION 17E**:

Questions for this section apply to all *Mathematics: HL* students, so they should not be coloured green.

page 496 **ANSWERS EXERCISE 5G** Question **16**, replace hint with:

16 Hint: Write out the terms of the sequence in order, then write out the terms in reverse order directly underneath. Add the terms vertically.

page 504 **ANSWERS EXERCISE 10B** Question **8 c**, should read:

8 **a** 4 units **b** $k = -3 \pm \sqrt{6}$ **c** ≈ 142 units^2

page 505 **ANSWERS REVIEW SET 10B** Question **6 b**, should read:

6 **a** $\approx 21.4°$ **b** ≈ 3.54 units^2

page 520 **ANSWERS EXERCISE 14C** 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 527 **ANSWERS EXERCISE 15D.2** Questions **6 c** and **d**, should read:

6 **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 $\dfrac{ax+b}{cx+d} = \dfrac{\frac{a}{c}(cx+d) - \frac{ad}{c} + b}{cx+d}$ and so on

As $|x| \to \infty,$ $\dfrac{b - \frac{ad}{c}}{cx+d} \to 0.$

$\therefore$ the horizontal asymptote is $y = \dfrac{a}{c}$.

page 535 **ANSWERS EXERCISE 16D** Question **11**, should read:

11 **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.

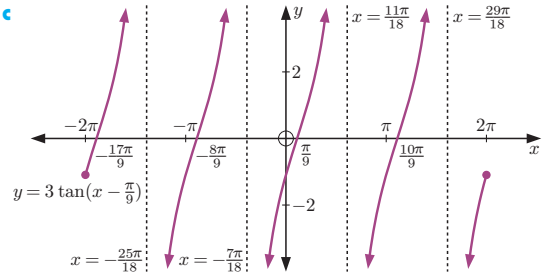
The function has vertex $(h,\ k)$, and y-intercept $ah^2 + k$.

pages 541, 544, 545 **ANSWERS SECTION 17E**:

Questions for this section apply to all *Mathematics: HL* students, so they should not be coloured green.

page 541 **ANSWERS EXERCISE 17F** Question **4 c**, should not have y intercept label of -1:

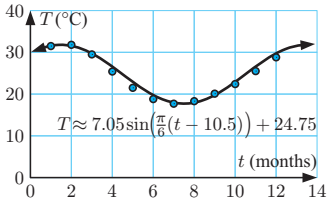
4 **c**



page 545 **ANSWERS REVIEW SET 17B** Question **14 c**, should read:

14 **a** $a \approx 7.05,\ b \approx \frac{\pi}{6},\ c \approx 10.5,\ d \approx 24.75$

b



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

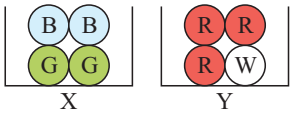
The following errata were made on 01/Nov/2019

page 69 **REVIEW SET 3A** Question **13**, should read:

13 At a particular moment, Earth is 4.3×10^9 km from Neptune and 1.5×10^9 km from Saturn. How many times further away is Neptune than Saturn?

page 268 **SECTION 11G INVESTIGATION 4, INDEPENDENT EVENTS** Question **2 a**, should read:

2 Consider randomly selecting a ball from each of the boxes alongside.



a Does the outcome of the draw from either box affect the outcome of the other?

page 351 **SECTION 13J INVESTIGATION 3, TRANSFORMING DATA** Question **3 b**, should read:

3 **a** Suppose we multiply each value in the original data set by 4. Calculate the mean and population standard deviation for the new data set.

b What do you expect to happen to the mean and standard deviation if each value in a data set is multiplied by $a > 0$?

page 352 **SECTION 13J INVESTIGATION 3, TRANSFORMING DATA** Question **4**, should read:

4 Suppose a data set $\{x_i\}$ has mean μ and standard deviation σ. Write down the mean and standard deviation for the data set:

a $\{ax_i\}$, $a > 0$ **b** $\{x_i + k\}$ **c** $\{ax_i + k\}$, $a > 0$

page 457 **EXERCISE 17C** 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 487 **ANSWERS EXERCISE 2E** Question **4 c**, should read:

4 **a** $\{x \mid x \geqslant 8\}$ **b** $\{x \mid -1 \leqslant x < 4\}$

c $\{x \in \mathbb{Z} \mid -3 < x < 4\}$ or $\{x \in \mathbb{Z} \mid -2 \leqslant x \leqslant 3\}$

d $\{x \in \mathbb{N} \mid x \leqslant 4\} \cup \{x \in \mathbb{N} \mid x = 6\}$

page 492 **ANSWERS REVIEW SET 3A** Question **13**, should read:

12 313 sheets **13** ≈ 2.87 times

page 496 **ANSWERS EXERCISE 5F** Question **8**, should read:

8 $S_n = \sum_{k=1}^{n} (2k-1) = n^2$

page 497 **ANSWERS REVIEW SET 5A** Question **14 a**, should read:

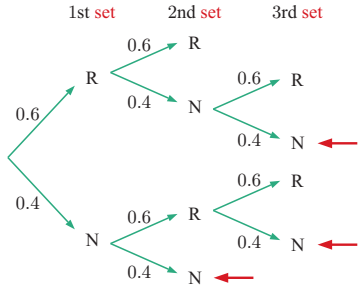
13 \$4800 **14** **a** €6622.88 **b** €13 313.28

page 507 **ANSWERS EXERCISE 11I** Question **10 a**, should read:

10 **a** $\frac{31}{52}$ **b** $\frac{70}{163}$ **11** $\frac{7}{15}$

page 508 **ANSWERS REVIEW SET 11B** Question **6 a**, should read:

6 **a**



page 515 **ANSWERS EXERCISE 13I** Question **7 d i**, should read:

7 **d** **i** ≈ 25.6 cm **ii** ≈ 18 people

page 540 **ANSWERS EXERCISE 17C** Question **14**, in order to answer reworded question should read:

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

The following errata were made on 23/Oct/2019

page 126 **REVIEW SET 5A** Question **9**, should read:

9 Each year, a school manages to use only 90% as much paper as the previous year. In the year 2010, they used 700 000 sheets of paper.

a Find how much paper the school used in the years 2011 and 2012.

b How much paper did the school use in total in the decade from 2008 to 2017?

page 357 **REVIEW SET 13B** Question **9**, should read:

9 Consider the frequency table alongside:

a Find the values of p and m.

b Hence find the mode, median, and range of the data.

c Given that $\sum xf = 254$, write the mean $\overline{x}$ as a fraction.

Score (x)	*Frequency* (f)	*Cumulative frequency*
6	2	2
7	4	m
8	7	13
9	p	25
10	5	30

page 371 **SECTION 14C Example 9**, 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 371 **EXERCISE 14C** Question **9**, should read:

9 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 quadratics $y = x^2 + b_1 x + c_1$, and $y = x^2 + b_2 x + c_2$ meets the x-axis.

page 502 **ANSWERS EXERCISE 8G** Question **3 c**, should read:

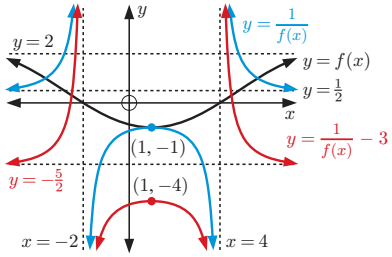
3 **a** $\theta \approx 1.25$ **b** $\theta \approx -0.983$ **c** $\theta \approx 2.76$

page 523 **ANSWERS EXERCISE 15C** Question **1 c**, should read:

1 **c** Domain is $\{x \mid x > 0\}$, Range is $\{y \mid y = 2, 3, 5, 7, \text{ or } 9\}$

page 536 **ANSWERS EXERCISE 16E** Question **4**, should have correct horizontal asymptote for $y = \frac{1}{f(x)} - 3$:

4



page 544 **ANSWERS REVIEW SET 17A** Question **14 e**, should use correct variable name:

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