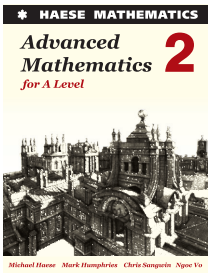


ERRATA

Advanced Mathematics 2

for A Level

First edition - 2017 initial print

The following erratum was made on 06/Jan/2022

page 295 **CHAPTER 13**, second to last line on page should read:

DECIMAL SEARCH

In a decimal search we improve the accuracy of our solution by a decimal place each iteration.

We achieve this by performing 9 calculations equally spaced on the interval.

The following erratum was made on 11/May/2020

page 494 **ANSWERS REVIEW SET 8A**, question **13 c** should read:

13 **a** concave up for $x \geqslant \frac{4}{3}$, concave down for $x \leqslant \frac{4}{3}$

b concave up for $x \leqslant -3$,
concave down for $-3 \leqslant x < 0$ and $x > 0$

c concave up for $-4 < x \leqslant -2$ and $x > 0$,
concave down for $x < -4$ and $-2 \leqslant x < 0$

The following erratum was made on 04/May/2020

page 502 **ANSWERS EXERCISE 12C**, question **2** parts **e** and **f** should read:

2 **a** $y = Ae^x$ **b** $y = \pm\sqrt{2x + c}$

c $y = Ae^t + 4$ **d** $P = \left(\frac{3}{2}t + c\right)^2$

e $Q = Ae^{2t} - \frac{3}{2}$ **f** $Q = -\frac{3}{2} \pm \sqrt{t + c}$

The following errata were made on 17/Sep/2019

page 305 **CHAPTER 13**, table at start of solution to example 6 should read:

$n = 4, \ a = 2, \ b = 3, \ f(x) = 2x^2 + 3$

$h = \dfrac{b - a}{4} = 0.25$

$x_i = 2 + 0.25i$

i	x_i	$f(x_i)$	x_{mid}	$f(x_{\text{mid}})$
0	2	11		
1	2.25	13.125	2.125	12.031 25
2	2.5	15.5	2.375	14.281 25
3	2.75	18.125	2.625	16.781 25
4	3	21	2.875	19.531 25

page 462 **CHAPTER 19**, last line of solution to example 7 should read:

Step 6: Since we have accepted H_0, we conclude that the variables are not negatively correlated.

The following errata was made on 25/Jul/2019

page 187 **CHAPTER 8**, blue box should read:

- $f(x)$ is **strictly increasing** on S if $f'(x) > 0$ for all $x \in S$
- $f(x)$ is **strictly decreasing** on S if $f'(x) < 0$ for all $x \in S$.

page 223 **CHAPTER 9**, text above blue box should read:

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

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

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

page 227 **CHAPTER 9**, 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 248 **CHAPTER 10,** second to last line in example 10 should read:

Example 10 — **Self Tutor**

Find $\int e^x \sin x\,dx$.

...

$$\therefore 2\int e^x \sin x\,dx = -e^x \cos x + e^x \sin x + c$$

$$\therefore \int e^x \sin x\,dx = \tfrac{1}{2}e^x(\sin x - \cos x) + c$$

page 265 **EXERCISE 11D**, question **4** function should read:

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

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

page 463 **EXERCISE 19D**, question **5** table should read:

The critical regions for a test of H_0: $\rho = 0$ against H_1: $\rho \neq 0$ for various significance levels are shown in the table alongside.

a Use technology to calculate the value of the test statistic for this hypothesis test.

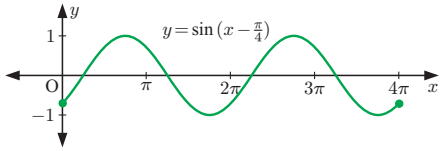
b Use the critical regions to determine the significance level(s) for which H_0 will be rejected.

c Check your answer to **b** using the p-value.

α	*Critical region*
0.1	$(-\infty, -1.83] \cup [1.83, \infty)$
0.05	$(-\infty, -2.26] \cup [2.26, \infty)$
0.02	$(-\infty, -2.82] \cup [2.82, \infty)$
0.01	$(-\infty, -3.25] \cup [3.25, \infty)$

page 475 **ANSWERS EXERCISE 4A**, question **6 f** should have diagram:

f



page 480 **ANSWERS REVIEW SET 4A**, question **6 d** should read:

d A vertical dilation with scale factor 2, then a horizontal dilation with scale factor 2, then a translation $\frac{\pi}{4}$ units right and $\frac{1}{2}$ unit upwards.

page 483 **ANSWERS EXERCISE 6B**, question **7** should have correct labels on diagram:

7 No, we could find another solution by reversing the 2s and 3s. So, the solution is not unique, and the sudoku would not be well-posed.

	3	2						
	2	3						

page 501 **ANSWERS EXERCISE 11D**, question **3 b** should be in units instead of units^2:

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 503 **ANSWERS EXERCISE 12D**, question **5 a** should read:

5 **a** $N \approx \dfrac{10^{30}}{1 + (5 \times 10^{27} - 1)e^{-kt}}$

page 504 **ANSWERS REVIEW SET 12B**, question **6 a** should read:

6 **a** $y = \left(\frac{1}{2}x \pm 2\right)^2$

The following erratum was made on 29/Nov/2018

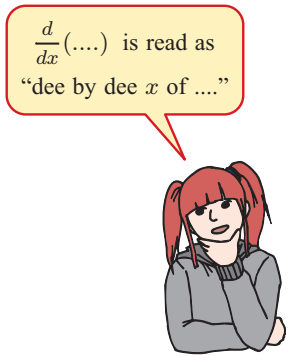
page 172 **CHAPTER 7**, add line to explanation and add bubble text:

A more useful method for solving this type of problem is **implicit differentiation**.

If we are given an implicit relation between y and x and we want to find $\frac{dy}{dx}$, we can differentiate both sides of the equation with respect to x, applying the chain, product, quotient, and any other rules as appropriate. This will generate terms containing $\frac{dy}{dx}$, and we then proceed to make $\frac{dy}{dx}$ the subject of the equation.

Using the chain rule, $\dfrac{d}{dx}(y^n) = \dfrac{d}{dy}(y^n) \times \dfrac{dy}{dx}$

$\therefore \quad \dfrac{d}{dx}(y^n) = ny^{n-1}\dfrac{dy}{dx}.$



For example, if $x^2 + y^2 = 4$, then $\dfrac{d}{dx}(x^2 + y^2) = \dfrac{d}{dx}(4)$

$\therefore \quad 2x + 2y\dfrac{dy}{dx} = 0$

$\therefore \quad \dfrac{dy}{dx} = -\dfrac{x}{y}$

The following errata were made on 23/Nov/2018

page 39 **CHAPTER 1**, blue box should read:

For $n \in \mathbb{Z}^+$,

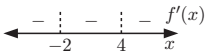
$$(a+b)^n = a^n + \binom{n}{1}a^{n-1}b + ... + \binom{n}{r}a^{n-r}b^r + ... + b^n$$
$$= \sum_{r=0}^{n} \binom{n}{r}a^{n-r}b^r$$

where $\binom{n}{r} = \dfrac{n!}{r!\,(n-r)!}$ is the **binomial coefficient** for $n \in \mathbb{Z}^+$, $r \in \mathbb{Z}_0^+$, $r \leqslant n$.

The **general term** or $(r+1)$**th term** in the binomial expansion is $T_{r+1} = \binom{n}{r}a^{n-r}b^r$.

page 495 **ANSWERS REVIEW SET 8B**, question **10 a** should have correct sign diagram:

10 a



The following errata were made on 05/Oct/2018

page 7 **GRAPHICS CALCULATOR INSTRUCTIONS**, Calculator instructions for Casio fx-991EX are also available.

page 41 **CHAPTER 1**, blue boxes should read:

For $n \in \mathbb{Q}$, $(a+b)^n = \sum_{r=0}^{\infty} \binom{n}{r} a^{n-r} b^r$

where $\binom{n}{r} = \dfrac{n(n-1)(n-2)....(n-r+1)}{r!}$ is the **binomial coefficient** for $n \in \mathbb{Q}$, $r \in \mathbb{Z}^+$, and $\binom{n}{0} = 1$.

....

For $n \in \mathbb{Q}$, $(a+bx)^n = a^n \sum_{r=0}^{\infty} \binom{n}{r} \left(\dfrac{bx}{a}\right)^r$

where $\binom{n}{r} = \dfrac{n(n-1)(n-2)....(n-r+1)}{r!}$ is the **binomial coefficient** for $n \in \mathbb{Q}$, $r \in \mathbb{Z}^+$, and $\binom{n}{0} = 1$.

The expansion **converges** for x such that $\left|\dfrac{bx}{a}\right| < 1$.

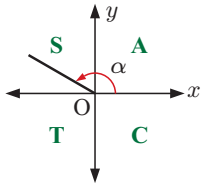
$\left|\dfrac{bx}{a}\right| < 1$ means $-\left|\dfrac{a}{b}\right| < x < \left|\dfrac{a}{b}\right|$.

page 120 **CHAPTER 5 EXAMPLE 8**, should read:

Example 8 — Self Tutor

If $\sin\alpha = \frac{5}{13}$ where $\frac{\pi}{2} < \alpha < \pi$, find the exact value of: **a** $\sin 2\alpha$ **b** $\tan 2\alpha$.

α is in quadrant 2, so $\cos\alpha$ is negative.



Now $\cos^2\alpha + \sin^2\alpha = 1$

$\therefore \cos^2\alpha + \frac{25}{169} = 1$

$\therefore \cos^2\alpha = \frac{144}{169}$

$\therefore \cos\alpha = \pm\frac{12}{13}$

$\therefore \cos\alpha = -\frac{12}{13}$ {as $\frac{\pi}{2} < \alpha < \pi$}

a $\sin 2\alpha = 2\sin\alpha\cos\alpha$

$\therefore \sin 2\alpha = 2\left(\frac{5}{13}\right)\left(-\frac{12}{13}\right)$

$= -\frac{120}{169}$

b $\tan\alpha = \dfrac{\sin\alpha}{\cos\alpha} = -\frac{5}{12}$

$\therefore \tan 2\alpha = \dfrac{2\tan\alpha}{1-\tan^2\alpha}$

$= \dfrac{2\left(-\frac{5}{12}\right)}{1-\left(-\frac{5}{12}\right)^2}$

$= \dfrac{-\frac{5}{6}}{1-\frac{25}{144}}$

$= -\frac{120}{119}$

page 308 **CHAPTER 13 EXAMPLE 7**, table in solution should read:

$n = 6$, $a = 1$, $b = 2$, $f(x) = \sqrt{6-x^2}$

$h = \dfrac{b-a}{n} = \dfrac{1}{6}$

$x_i = 1 + \frac{1}{6}i$

i	x_i	$f(x_i)$
0	1	2.236 068
1	$1\frac{1}{6}$	2.153 808
2	$1\frac{1}{3}$	2.054 805
3	$1\frac{1}{2}$	1.936 492
4	$1\frac{2}{3}$	1.795 055
5	$1\frac{5}{6}$	1.624 466
6	2	1.414 214

GRAPHING PACKAGE