Level 3
Mathematics
Examination 1

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Creator: Judy Anders
Title: Level 3 Mathematics Examination 1 with detailed answers
ISBN: 9781876324469 (eBook)
Series: Mathematics Examinations with detailed answers for High Schools
Target Audience: School age. Secondary.
Subject: Mathematics
Other Creators: Barbara Healy, William Paul Healy

About the Authors: Barbara Healy BSc BEd and William Paul Healy BSc BA Dip Ed are principal writers for Kilbaha Education. They are experienced classroom teachers of mathematics with specialised skills in writing assessment questions and detailed answers for all levels of mathematics. Together they have been creating mathematics content for Australian schools for more than 30 years. Teachers and parents use their highly regarded educational content on a regular basis.

LEVEL 3

MATHEMATICS EXAMINATION 1

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Notes to Teachers

This is a Digital Publication supplied in both PDF and WORD formats with a school site licence to reproduce for students in both print and electronic formats.

- This examination is based on a syllabus containing topics for Year 9 Mathematics. Some of these topics are: (not all are necessarily included in this examination)

  powers, roots and reciprocals, directed number and scientific notation, ratio, percentages, angles and triangles, quadrilaterals and other polygons, congruent and similar triangles, transformations, Pythagoras' theorem, perimeter and area, surface area and volume, trigonometry, expansion and factorisation, fractions and indices, equations, linear and quadratic graphs, probability, reading and drawing graphs, analysis of data, practical graphs.

- Teachers should examine the questions to judge if they are suitable for their classes
- This is a 1.5 hour examination (total = 80 marks)
- The examination can be shortened if required by removing some of the questions
- A set of detailed answers with a marking scheme is supplied with this examination
- A multiple-choice answer sheet is supplied with this examination
- While every effort has been made to ensure the correctness of each question and answer, there is no guarantee of perfection. Please advise of you believe you have found an error.

STUDENT NAME _____

Examination 1

LEVEL 3 MATHEMATICS

Reading time: 15 minutes
Total writing time: 1.5 hours

QUESTION AND ANSWER BOOK

Structure of book

Section	Number of questions	Number of questions to be answered	Number of Marks
A	10	10	10
B	12	12	70

Directions to students

Materials
Question and answer book of 19 pages.
Working space is provided throughout the book.
You may use an approved calculator, ruler, protractor, set square and aids for curve sketching.

The Examination.
Ensure that you write your **name** in the space provided on the cover of this book.
Answer **all** questions.
There is a total of 80 marks available for the examination.
The marks for each part of each question are shown.
Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.
Unless otherwise specified, give answers correct to two decimal places.
Angles in all diagrams are measured in degrees.
All written responses should be in English.

SECTION A consists of ten multiple choice questions. Write the letter which corresponds to your answer in the box at the right of each question. Each question is worth 2 marks.
Show your working in the space provided. Marks will not be deducted for incorrect answers.

Question 1
Since beginning Year 7 two years ago a student's bus fare has increased by 150%.
If the fare was 50c in Year 7 the fare now, to the nearest five cents, is

A. 60c

B. 75c

C. 90c

D. $1.05

E. $1.25

Question 2
A shopkeeper sells brass numbers for houses. His stock is low at the moment. He only has the numbers 2 and 5 left. How many different house numbers are possible with these two numbers?

A. 2

B. 3

C. 4

D. 5

E. 6 or more

Question 3
Complete the following statement: In the circle below a ..... is shaded.

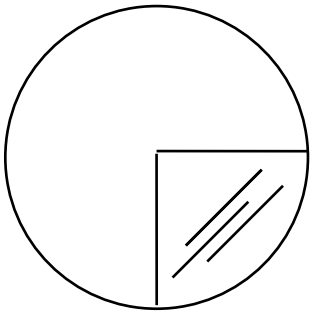
A. radius

B. chord

C. segment

D. sector

E. arc



SECTION B consists of twelve short answer questions.
Answer each question in the space provided. Show all working.
Write your final answer in the box provided.
The marks for each part of each question are shown at the end of the part.
The total number of marks for Section B is 70

Question 1 (6 marks)

a. A school collected $720 for charity and decided to divide the money between two charities in the ratio 3:2. What percentage did each charity receive?

.....

.....

.....

(2 marks)

b. The mass of each of 10 children was measured and the mean mass was found to be 54 kilograms. Unfortunately, only nine of the masses have been recorded below.

42kg, 65kg, 70kg, 52kg, 39kg, 68kg, 44kg, 57kg, 59kg

i. Determine the mass of the 'missing person'.

.....

.....

.....

(2 marks)

ii. Determine median mass for this group of ten children.

.....

.....

.....

(2 marks)

LEVEL 3 MATHEMATICS

EXAMINATION 1

ANSWER SHEET

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NAME _____

INSTRUCTIONS

- Write your name in the space provided above.
- Marks will **NOT** be deducted for incorrect answers.
- **NO MARK** will be given if more than **ONE** answer is completed for any question.
- All answers must be completed like **THIS** example.

A	B	C	D	E

SECTION A

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E

1. E

Increase in fare $= 150\%$ of 50c $= 1.5 \times 50 = 75$c Current fare $= 50\text{c} + 75\text{c} = \$1.25$

2. C

Single digit numbers: 2, 5 Double digit numbers: 25, 52
Four different numbers are possible.

3. D A sector of the circle has been shaded.

4. E

Third angle $= 180° - (40° + 80°) = 60°$
As all angles are less than $90°$, the triangle is acute-angled.

5. C

Worth of account $= 1000 \times 1.1^n$

If $n = 6$, worth $= 1000 \times 1.1^6 = \$1771.56$

If $n = 7$, worth $= 1000 \times 1.1^7 = \$1948.72$

If $n = 8$, worth $= 1000 \times 1.1^8 = \$2143.59$

Between year 7 and 8 the worth of the account will be \$2000.

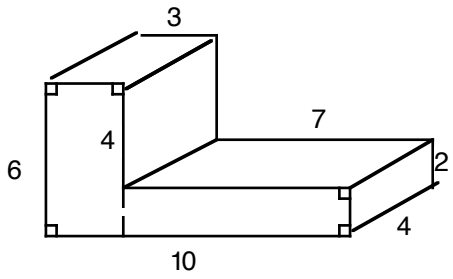
6. A

$s = 180(n-2)$

$\therefore \frac{s}{180} = n - 2$

$\therefore \quad n = \frac{s}{180} + 2$

7. D



$A_{\text{front}} = 6 \times 3 + 7 \times 2 = 32$

$A_{\text{back}} = 32$

$A_{\text{base}} = 10 \times 4 = 40$

$A_{\text{left side}} = 6 \times 4 = 24$

$A_{\text{right side}} = 2 \times 4 = 8$

$A_{\text{top surfaces}} = 3 \times 4 + 4 \times 4 + 4 \times 7 = 56$

Total surface area $= 32 + 32 + 40 + 24 + 8 + 56 + 192$ sq units

8. C

In 20 minutes the tip of the minute hand will have travelled $\frac{1}{3}$ of the circumference of a circle.

Distance travelled $= \frac{1}{3}\pi d = \frac{1}{3}\pi \times 14 = 14.7$ cm

9. B

Possible outcomes: HHH, HHT, HTH, THH, TTH, THT, HTT, TTT

$p(2 \text{ heads}) = \frac{3}{8}$, $p(3 \text{ heads}) = \frac{1}{8}$, $\therefore p(\text{at least } 2 \text{ heads}) = \frac{3}{8} + \frac{1}{8} = \frac{4}{8} = \frac{1}{2}$

10. C

population $= 50 \times 10 = 500$; area $= 6 \div 2.5 = 15$ km^2

population density $= \frac{500}{15} \approx 30$ people per km^2

(10 × 2 = 20 marks)

Question 1

a. percentage received by first charity $= \frac{3}{5} \times \frac{100}{1} = 60\%$ [1]

percentage received by second charity $= 100\% - 60\% = 40\%$ [1]

b. **i.** Let x denote the missing weight

$$\text{average weight} = 54\text{kg} = \frac{(42+65+70+52+39+68+44+57+59+x)}{10}$$

$$\therefore 540 = 496 + x$$

$$\therefore \quad x = 44 \text{ kg}$$ [2]

ii. Weights listed in ascending order are $39, 42, 44, 44, 52, 57, 59, 65, 68, 70$

Median weight $= \frac{52+57}{2} = 54.5$ kg [2]

Question 2

a. Profit $= \$25 - \$20 = \$5$ [1]

b. Percentage $= \frac{5}{20} \times \frac{100}{1} = 25\%$ [1]

c. Profit in dollars $= 35\%$ of $\$20 = 0.35 \times 20 = \$7$

New price $\$20 + \$7 = \$27$ [2]

d. Let x denote the intake last financial year

18% of $x = \$10800$

$\therefore \ 0.18x = 10800$

$\therefore \quad x = \frac{10800}{0.18} = \$60000$

Owners intake last financial year was $60,000 [2]

Question 3

a. length $= w + 3$ [2]

b. $w + w + 3 + w + w + 3 = 18$

$\therefore 4w + 6 = 18$ [2]

c. $4w + 6 = 18$

$\therefore \ 4w = 12$

$\therefore \quad w = 3$

$l = w + 3 = 3 + 3 = 6\text{cm}$

Area $= 3 \times 6 = 18 \text{ cm}^2$

[1] [1]

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