

Level 3

Mathematics

Examination 3



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MATHEMATICS EXAMINATION 3



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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 = 90 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 if you believe you have found an error.

STUDENT NAME _____

Examination 3

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	25	25	25
B	7	7	35
C	3	3	30

Directions to students

Materials

Question and answer book of 28 pages.

Working space is provided throughout the book.

You may use an approved calculator, ruler, protractor, set square and aids for curve sketching.

A formula sheet is provided.

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 90 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.

Angles in all diagrams are measured in degrees.

All written responses should be in English.

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Level 3 Mathematics Formulas

Area of circle	πr^2
Circumference of circle	$2\pi r$
Area of rectangle	$L \times W$
Area of triangle	$\frac{1}{2}bh$
Area of parallelogram	bh
Area of trapezium	$\frac{1}{2}(a+b)h$
Volume of sphere	$\frac{4}{3}\pi r^3$
Volume of cylinder	$\pi r^2 h$
Volume of cone	$\frac{1}{3}\pi r^2 h$
Surface area of rectangular prism	$2(lh + lw + wh)$
Surface area of cylinder	$2\pi r^2 + 2\pi rh$
Surface area of sphere	$4\pi r^2$

SECTION A MULTIPLE CHOICE

There are 25 multiple choice questions. Write the letter which corresponds to your answer in the box at the right of each question. Each question is worth 1 mark.
 Show your working in the space provided. Marks will not be deducted for incorrect answers.

Question 1

$6a^0 \times (b^2)^3$ equals

- A. $6ab^6$
- B. $6b^6$
- C. $6b^5$
- D. b^6
- E. b^5

Question 2

$\frac{5x^{-1}y}{10y^2}$ equals

- A. $\frac{1}{2xy}$
- B. $\frac{1}{50xy}$
- C. $\frac{2}{xy}$
- D. $\frac{2y}{x}$
- E. $\frac{1}{2xy^3}$

SECTION B consists of seven short answer questions.
 Answer each question in the space provided. Show all working.
 Write your final answer in the box where this is 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 35

Question 1(5 marks)

Simplify each of the following

a. $7a - 2(3a + 1)$

.....

(2 marks)

b. $\frac{(x+2)(x-1)}{(x+3)} \div \frac{4(x-1)}{x+3}$

.....

(3 marks)

SECTION C ANALYSIS TASKS

There are three questions worth 10 marks each.
 Answer each question in the space provided. Show all working.
 Write your final answer in the box where this is provided.

Question 1(10 marks)

The following data show the amounts spent in dollars by 20 people going through a supermarket checkout.

19 , 42 , 68 , 39 , 66 , 13 , 44 , 23 , 24 , 56 , 62 , 12 , 84 , 73 , 88 , 99 , 95 , 74 , 71 , 82

a. Complete the stem and leaf for these data.

Stem	Leaf
1	
2	
3	
4	
5	
6	
7	
8	
9	

(3 marks)

b. What is the smallest amount spent?

.....

(1 mark)

c. How many people spent less than \$42?

.....

(1 mark)

LEVEL 3 MATHEMATICS

EXAMINATION 3

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
11	A	B	C	D	E
12	A	B	C	D	E

13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E
21	A	B	C	D	E
22	A	B	C	D	E
23	A	B	C	D	E
24	A	B	C	D	E
25	A	B	C	D	E

<p>1. Answer B $6 \times 1 \times b^6 = 6b^6$</p>	<p>2. Answer A $\frac{5x^{-1}y}{10y^2} = \frac{5y}{10xy^2} = \frac{1}{2xy}$</p>
<p>3. Answer D Similar triangles. $\frac{x}{8} = \frac{9}{12}$ $\Rightarrow 12x = 72$ $\Rightarrow x = 6$</p>	<p>4. Answer C Co-interior angles sum to 180°. $3a + 60 = 180$ $\Rightarrow 3a = 120$ $\Rightarrow a = 40$</p>
<p>5. Answer E $x^2 - 5x - 6 = (x - 6)(x + 1)$</p>	<p>6. Answer B $(3x - 5)(2x + 1)$ $= 6x^2 + 3x - 10x - 5$ $= 6x^2 - 7x - 5$</p>
<p>7. Answer E $\tan a = \frac{4}{3}$ $\Rightarrow a = \tan^{-1}\left(\frac{4}{3}\right)$ $\Rightarrow a = 53^\circ$</p>	<p>8. Answer E $\cos 35^\circ = \frac{x}{25}$ $\Rightarrow x = 25 \times \cos 35^\circ$ $\Rightarrow x = 20.4788$</p>
<p>9. Answer C $x^2 + (6.3)^2 = (10.7)^2$ $\Rightarrow x^2 = (10.7)^2 - (6.3)^2$ $\Rightarrow x = \sqrt{(10.7)^2 - (6.3)^2}$ $\Rightarrow x = 8.64$ $\Rightarrow x = 8.6$ to one decimal place</p>	<p>10. Answer B There are 4 kings in a pack of 52 cards. Probability = $\frac{4}{52} = \frac{1}{13}$</p>
<p>11. Answer B Probability = $\frac{8}{20} = \frac{2}{5}$</p>	<p>12. Answer E $\frac{3}{5} \div p = \frac{3}{5p}$</p>
<p>13. Answer B $\frac{y}{3} = \frac{6}{5}$ $\Rightarrow y = \frac{18}{5}$ $\Rightarrow y = 3.6$</p>	<p>14. Answer A $(x - 5)$ represents translation 5 units in the positive X direction. $+ 1$ represents translation 1 unit in the positive Y direction.</p>
<p>15. Answer C X intercepts when $x^2 + 6x - 27 = 0$ $\Rightarrow (x + 9)(x - 3) = 0$ $\Rightarrow x = -9$ or $x = 3$</p>	<p>16. Answer C The line parallel to the Y axis cutting the X axis at 4 has the equation $x = 4$.</p>

Question 1

<p>a. $7a - 2(3a + 1)$ $= 7a - 6a - 2$ $= a - 2$</p> <p style="text-align: right;">[2 marks]</p>	<p>b. $\frac{(x+2)(x-1)}{(x+3)} \div \frac{4(x-1)}{x+3}$ $= \frac{(x+2)(x-1)}{(x+3)} \times \frac{x+3}{4(x-1)}$ $= \frac{(x+2)}{4}$</p> <p style="text-align: right;">[3 marks]</p>
---	--

Total = 5 marks

Question 2

Area = area ① + area ② + area ③
 $= 9x + x(2x + 4) + x^2$
 $= 9x + 2x^2 + 4x + x^2$
 $= 3x^2 + 13x$

Total = 5 marks

Question 3

<p>a. $y^2 - 1$ $= (y - 1)(y + 1)$</p> <p style="text-align: right;">[1 mark]</p>	<p>b. $ab - 3b - 4a + 12$ $= b(a - 3) - 4(a - 3)$ $= (a - 3)(b - 4)$</p> <p style="text-align: right;">[2 marks]</p>
<p>c. $3x^2 - 30x + 63$ $= 3(x^2 - 10x + 21)$ $= 3(x - 7)(x - 3)$</p> <p style="text-align: right;">[2 marks]</p>	

Total = 5 marks

Question 1

a. Complete the stem and leaf for these data.

Stem	Leaf
1	2 , 3 , 9
2	3 , 4
3	9
4	2 , 4
5	6
6	2 , 6 , 8
7	1 , 3 , 4
8	2 , 4 , 8
9	5 , 9

[2 marks]

<p>b. Smallest amount spent = \$12 [1 mark]</p>	<p>c. Number of people spending less than \$42 = 6 [1 mark]</p>
<p>d. Number of people spending more than \$88 = 2. $= \frac{2}{20} \times 100 = 10\%$ [2 marks]</p>	<p>e. Median amount spent $= \frac{62 + 66}{2} = \frac{128}{2} = \\64 [1 mark]</p>
<p>f. Lower quartile $= \frac{24 + 39}{2} = \frac{63}{2} = \\31.50 [1 mark]</p>	<p>g. Upper quartile $= \frac{74 + 82}{2} = \frac{156}{2} = \\78 [1 mark]</p>
<p>h. Interquartile range = $78 - 31.50 = \\$46.50$ [1 mark]</p>	

Total = 10 marks

Kilbaha Education Mathematics Examinations High Schools

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