



SPRINGFIELD SECONDARY SCHOOL
End-of-Year Examination 2023
Secondary 2 Normal Academic

STUDENT
NAME

CLASS

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INDEX
NUMBER

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MATHEMATICS

Paper 2

4045/02

6 October 2023

1 hour 30 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all the work you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, glue or correction fluid.

Section A

Answer **all** questions.

Section B

Choose **one** question.

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in loss of marks. The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 50.

For Examiner's Use	
Section A	/42
Section B	/8
Total	/50

Do not turn over this question paper until you are told to do so.

Section A (42 marks)

Answer **all** the questions in this section.

1 (a) Simplify $\frac{4mn^2}{9} \div \frac{14m^2}{3}$.

Answer [2]

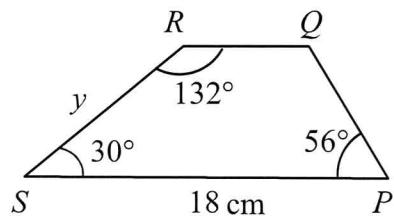
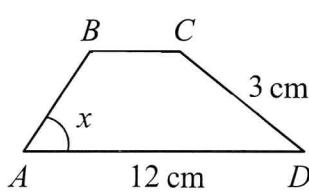
(b) Expand and simplify $2(x+3) - 3(x+4)$.

Answer [2]

2 Simplify $\frac{3q^2 - 12q}{q^2 - 16}$.

Answer [3]

- 3 In the diagram, quadrilateral $ABCD$ is similar to quadrilateral $PQRS$.



Find

- (a) x ,

Answer $x = \dots \text{ } [1]$

- (b) y .

Answer $y = \dots \text{ } [2]$

- 4 The length, h cm, of a rectangle is inversely proportional to its breadth, b cm.
The length of the rectangle is 9 cm when its breadth is 7 cm.

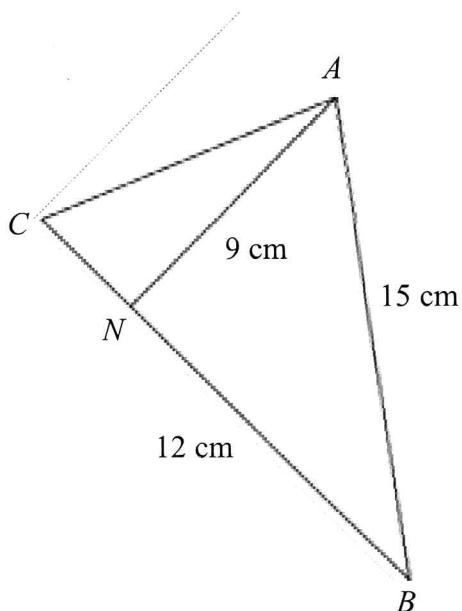
- (a) Find an equation connecting h and b in the form of $hb = k$, where k is a constant.

Answer $\dots \text{ } [2]$

- (b) Explain what the constant k represents.

..... [1]

- 5** ABC is a triangle and N is a point on BC .
 $AB = 15 \text{ cm}$, $BN = 12 \text{ cm}$ and $AN = 9 \text{ cm}$.



- (a) Show that ABN is a right-angled triangle.

Answer

[2]

- (b) The area of triangle ABC is 71.5 cm^2 .

Find BC .

Answer $BC = \dots \text{ cm}$ [2]

6 A pen costs $\$x$ and a notebook costs $\$4$ more than the pen.

- (a) Timothy bought 5 pens.

Write down an expression, in terms of x , for the amount that Timothy paid.

Answer [1]

- (b) Umairah bought 3 notebooks.

Write down an expression, in terms of x , for the amount that Umairah paid.

Answer [1]

- (c) Umairah spent $\$9$ more than Timothy.

Write down an equation in x to represent this information and solve it to find the amount that Umairah paid.

Answer \$ [3]

- 7 The test scores for a class of 40 students are shown in the table below.

Marks	Frequency
$0 \leq x < 10$	5
$10 \leq x < 20$	6
$20 \leq x < 30$	12
$30 \leq x < 40$	13
$40 \leq x < 50$	p

- (a) (i) Using the information given, show that $p = 4$.

Answer

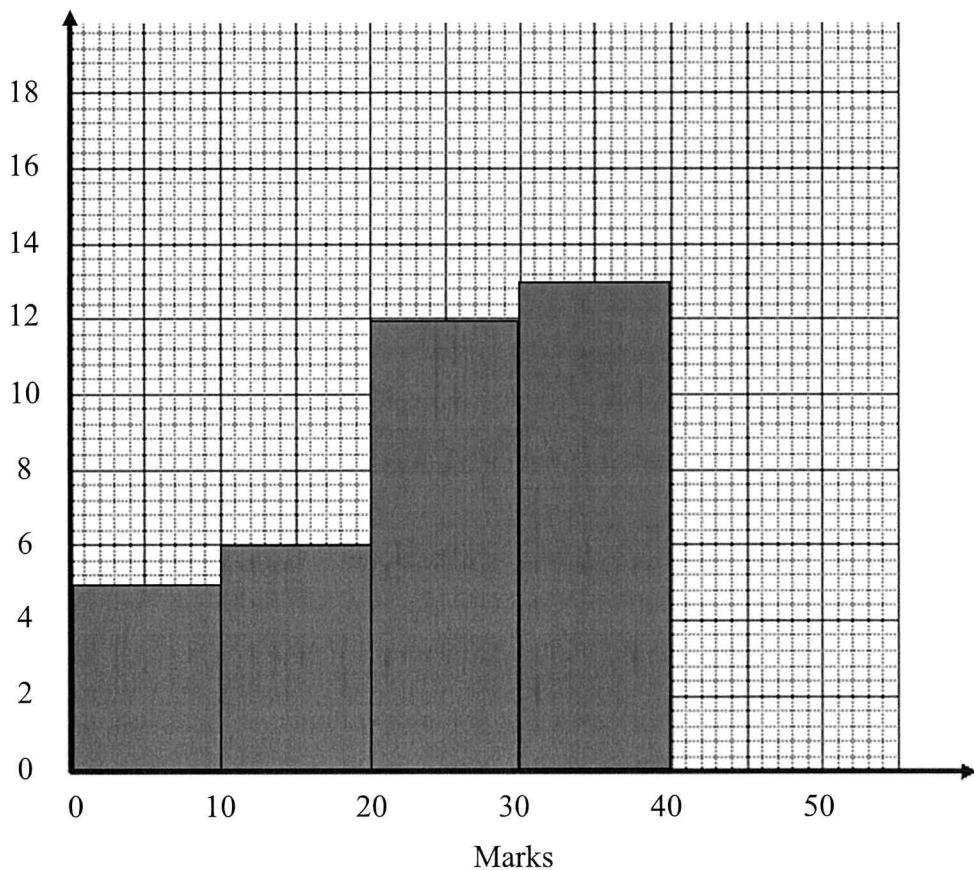
[1]

- (ii) A histogram is drawn to represent the information.

Complete the histogram.

[1]

Frequency



- (b) Calculate an **estimate** of the mean test score for the class.

Answer marks [3]

- 8 A polygon has 13 sides.

- (a) Find the sum of interior angles of the 13-sided polygon.

Answer ° [2]

- (b) One of the interior angles is 72° .
The remaining angles are x° each.

Find the value of x .

Answer $x = \dots$ [2]

- 9 A food supplier sells baked beans in cylindrical cans of dimensions as shown in Fig. 1.

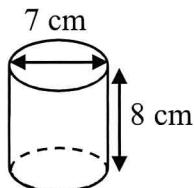


Fig. 1

The supplier receives an order to ship 216 cans of baked beans.

To ship the order, he needs to pack them in rectangular boxes.

The table below shows two box sizes that he is considering to purchase.

Box size	Dimensions (cm)	Maximum number of cans per box	Cost per box (\$)
Large	$21 \times 21 \times 17$	18	1.20
Medium	$14 \times 21 \times 9$	x	0.50

- (a) The baked bean cans are packed vertically as shown in Fig. 1.

By considering the dimensions of the medium box, show that $x = 6$.

Answer

[1]

- (b) An extra \$5 is charged for purchases of less than 15 boxes.

The supplier wants the cheapest option.

Which box size should he purchase? Show your working clearly.

Answer

[5]

- 10** The table of below shows the graph $y = 3x - 2$ for $-3 \leq x \leq 3$.

x	-3	-2	-1	2	3
y	-11	a	-5	4	7

- (a)** Calculate the value of a .

Answer $a = \dots \dots \dots \dots \dots$ [1]

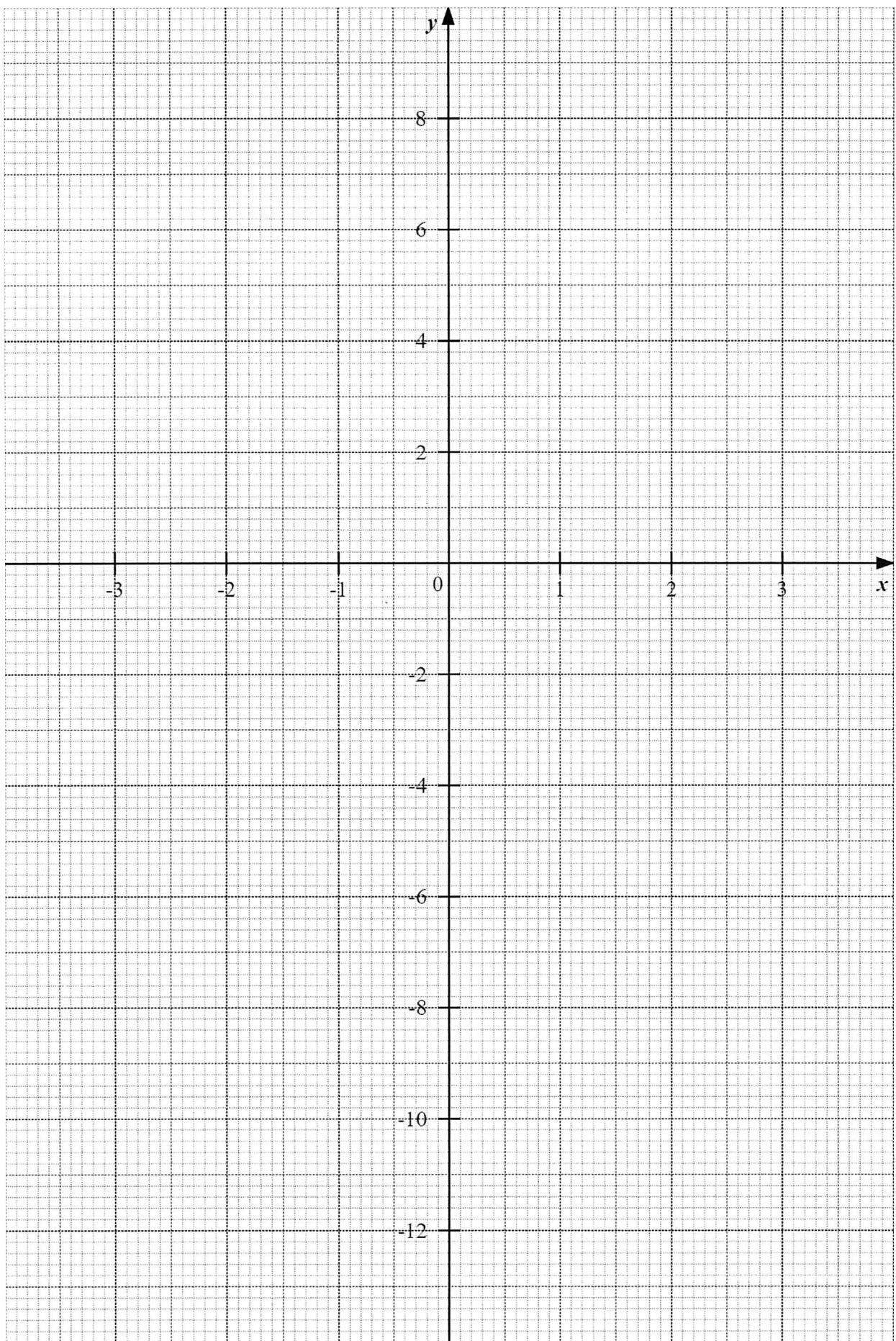
- (b)** Using the grid on **page 11**, plot the graph $y = 3x - 2$ for $-3 \leq x \leq 3$. [2]

- (c)** The point $C(p, 2.5)$ lies on the graph.

Mark and label point C on your graph. [1]

- (d)** Write down the coordinates of the y-intercept.

Answer $(\dots \dots \dots \dots , \dots \dots \dots)$ [1]



Section B (8 marks)

Answer **one** question from this section. Each question carries 8 marks.

- 11** The stem and leaf diagram shows the test scores for a class of students.

Stem	Leaf				
2	0	1	6	6	7
3	1	2			
4	0	3	4	4	6
5	5	7	7	7	9
6	0	2			
7	1	2			

Key: 2 | 1 means 21 marks

- (a)** Find

- (i)** the total number of students who took the test,

Answer students [1]

- (ii)** the modal score,

Answer marks [1]

- (iii)** the median score.

Answer marks [1]

- (b)** The passing mark of the test is 40 marks.
A student is selected at random.

Find the probability of selecting a student who passed the test.
Give your answer as a fraction in the simplest form.

Answer [1]

- (c) Students who scored less than 45 marks are required to attend remedial.

Find the percentage of students who need to attend remedial.

Answer % [2]

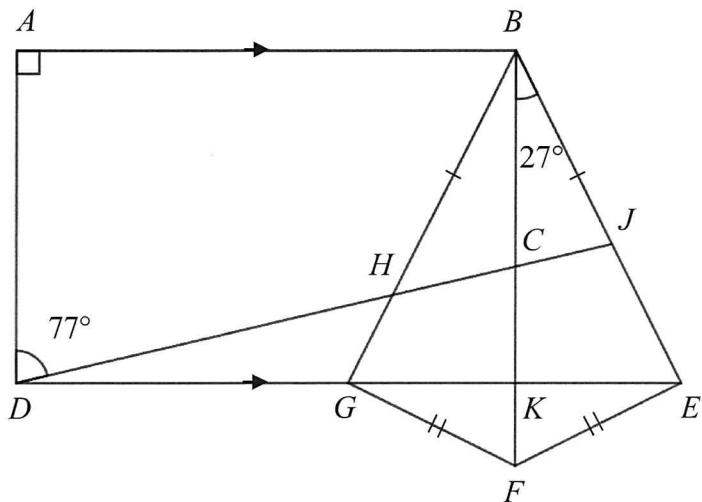
- (d) x students took the test on another day.

Their scores were included and the median score became 43.

Find the minimum value of x .

Answer $x = \dots$ [2]

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The diagram shows two quadrilaterals $ABGD$ and $BEFG$.

Angle $ADH = 77^\circ$, angle $CBE = 27^\circ$ and angle DAB is a right angle.

AB is parallel to DG .

$BG = BE$ and $FG = FE$.

$DHCJ$ and $DGKE$ are straight lines.

- (a) Write down the names of quadrilaterals $ABGD$ and $BEFG$.

Answer $ABGD$:

$BEFG$: [2]

- (b) Find angle BGE .

Answer Angle $BGE = \dots^\circ$ [3]

(c) Find angle ABJ .

Answer Angle $ABJ = \dots \circ$ [1]

(d) Find angle CJB .

Answer Angle $CJB = \dots \circ$ [2]

~END OF PAPER~