Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2023

Mathematics

StemUp Model Solution

Unit M6 Paper 1
(Non-Calculator)
Foundation Tier



[GMC61]

GMC61

WEDNESDAY 7 JUNE, 9.15 am–10.15 am

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

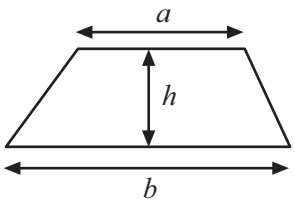
Write your Centre Number and Candidate Number in the spaces provided at the top of this page. **You are provided with Foundation Tier Additional Support Materials for use with this paper.**
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all fourteen** questions.
All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **must not** use a calculator for this paper.

INFORMATION FOR CANDIDATES

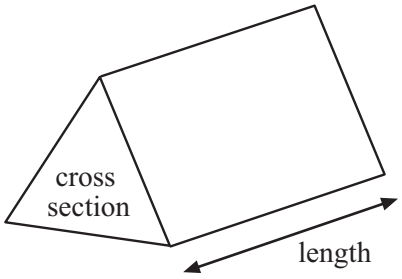
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on page 2.

Formula Sheet

Area of trapezium $= \frac{1}{2}(a + b)h$



Volume of prism = area of cross section × length



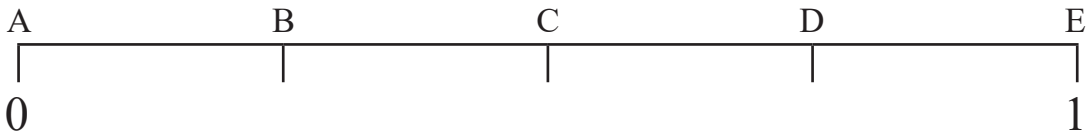
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1 There are 80 packets of crisps in a school tuck shop.

The number of packets of each flavour is shown in the table.

Cheese & Onion	Pickled Onion	Prawn Cocktail	Ready Salted	Salt & Vinegar
20	7	8	5	40

A packet of crisps is chosen at random.



Which **letter** on the scale shows the probability that the flavour is

(a) Salt & Vinegar,

$P(S \& V) = \frac{40}{80} = \frac{1}{2}$

Answer C [1]

(b) Cheese & Onion,

$P(C \& O) = \frac{20}{80} = \frac{1}{4}$

Answer B [1]

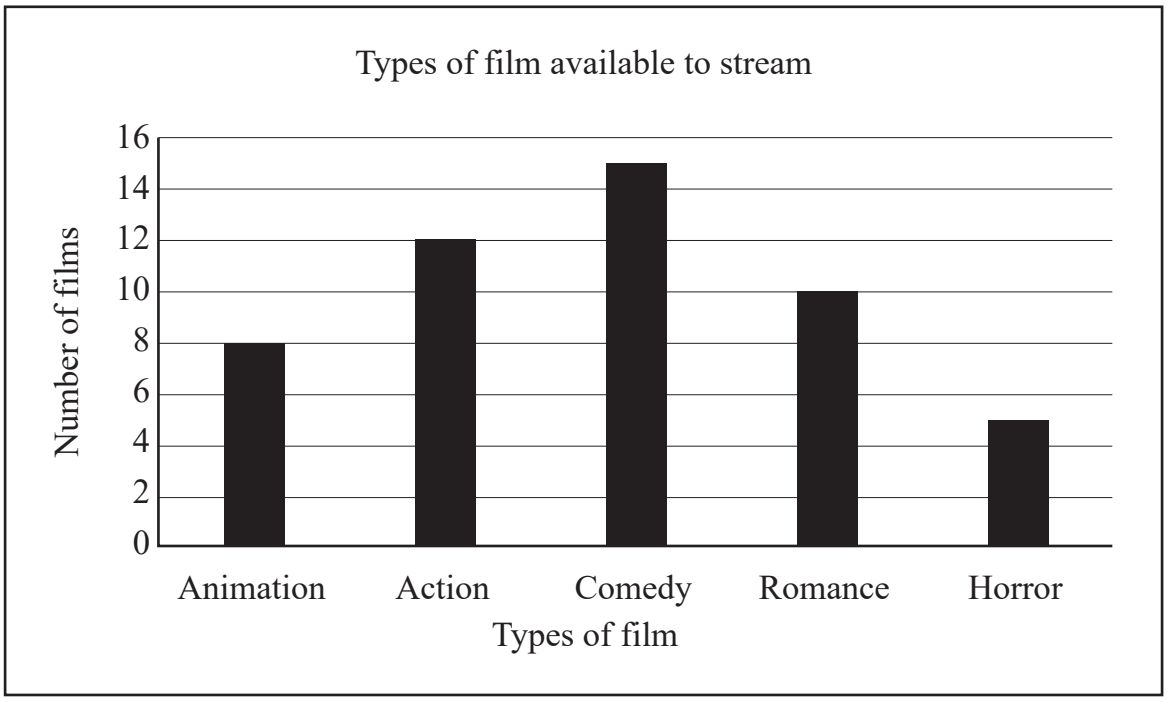
(c) Roast Chicken?

P(Roast Chicken) = 0, there are none

Answer A [1]

[Turn over

2 The chart shows information about films that are available for streaming.



A film is chosen at random.

(a) What is the probability that the film chosen is a Romance?

Total = 8 + 12 + 15 + 10 + 5 = 50 films

$P(\text{Romance}) = \frac{10}{50} = \frac{1}{5}$

Answer $\frac{1}{5}$ [2]

(b) What is the probability that an Action film is **not** chosen?

Not Action = 50 − 12 = 38

$P(\text{not Action}) = \frac{38}{50} = \frac{19}{25}$

Answer $\frac{19}{25}$ [1]

3 **(a)** Show how Jack can **estimate** an answer to 588 ÷ 18 and write down his answer.

$588 \approx 600$ and $18 \approx 20$

$600 \div 20 = 60 \div 2 = 30$

Answer 30 [2]

(b) Jill knows that she can divide by 18 by first dividing by 3 and then by 6

Using a similar method to Jill's, show how you can calculate 972 ÷ 36 and give your answer.

$36 = 4 \times 9$

divide by 4 then by 9:

$972 \div 4 = 243$

$243 \div 9 = 27$

$$4 \overline{)\,9\,{}^{1}7\,{}^{1}2\,} \quad 243$$

$$9 \overline{)\,2\,4\,{}^{6}3\,} \quad 027$$

Answer 27 [3]

4 The first three terms of a sequence are 1, 5 and 13

The rule is "add the next multiple of 4"

Find the next two terms in this sequence.

1 5 13 25 41 [2]

+4 +8 +12 +16

[Turn over

5 There are 30 pupils in a class.

$\frac{3}{5}$ are girls. $\frac{3}{5} \times 30 = 18$ girls, $30 - 18 = 12$ boys

$\frac{2}{9}$ of the girls are absent. $\frac{2}{9} \times 18 = 4$ girls absent

25% of the boys are absent. 25% of 12 = 12 ÷ 4 = 3 boys absent

(a) Complete the table to show this information.

	Girls	Boys
Number of pupils	18	12
Absent	4	3
Present	14	9

[2]

(b) What fraction of the pupils are present?

Present = 14 + 9 = 23 out of 30

Answer $\frac{23}{30}$ [1]

6 The pulse rate of an athlete is taken before and after training.



His starting pulse was 54 beats per minute.

After training, it increased by $\frac{1}{6}$ of this value.

Show that each beat now lasts less than 1 second.

$\frac{1}{6} \times 54 = 54 \div 6 = 9$

New pulse = 54 + 9 = 63 beats per minute

63 beats in 60 seconds

1 beat lasts $\frac{60}{63}$ seconds

$\frac{60}{63} < 1$ because 60 < 63

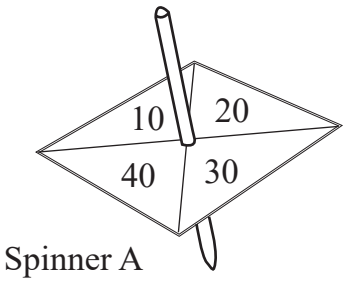
(63 beats per minute is more than 60 beats per minute,
which is more than 1 beat per second)

∴ each beat now lasts less than 1 second

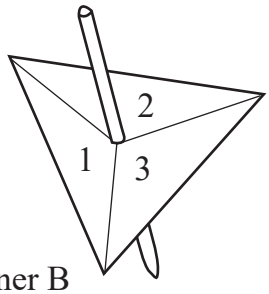
[4]

[Turn over

7 Two fair spinners are each spun once.



Spinner A



Spinner B

The scores on each spinner are multiplied together.

(a) Complete the table of outcomes.

		Spinner A			
	×	10	20	30	40
Spinner B	1	10	20	30	40
	2	20	40	60	80
	3	30	60	90	120

[2]

(b) What is the probability that the outcome is 60?

60 = 2 × 30 or 3 × 20: 2 out of 12

$\frac{2}{12} = \frac{1}{6}$

Answer $\frac{1}{6}$ [1]

(c) What is the probability that the outcome is less than 40?

Less than 40: 10, 20, 30, 20, 30

5 outcomes out of 12

Answer $\frac{5}{12}$ [2]

8 **(a)** Given that $23 \times 146 = 3358$

write down the answer to 2.3×1.46

Answer 3.358 [1]

(b) Showing clearly how you do it, **estimate** the answer to

$$\frac{202 \times 29}{0.48}$$

$202 \approx 200, \quad 29 \approx 30, \quad 0.48 \approx 0.5$

$$\frac{200 \times 30}{0.5} = \frac{6000}{0.5} = 6000 \times 2 = 12\,000$$

Answer 12 000 [3]

9 In April, 30 males and 20 females took their driving test.

50% of the males passed and 40% of the females passed.

What percentage of people who took the test failed?



Males passed: 50% of 30 = 15

Females passed: 40% of 20 = 8

Passed = 15 + 8 = 23

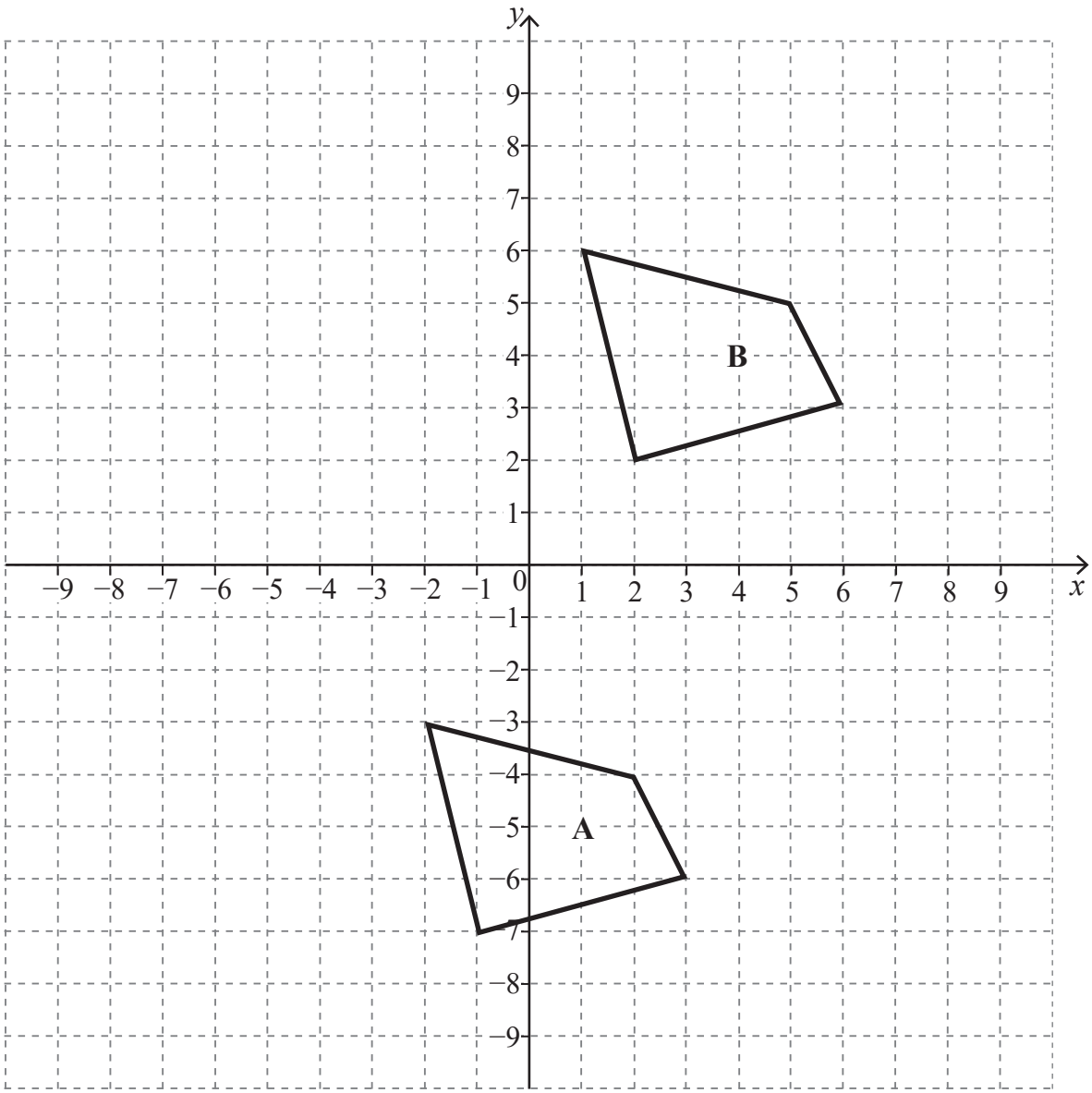
Failed = 50 − 23 = 27

$$\frac{27}{50} \times 100 = \frac{54}{100} \times 100 = 54\%$$

Answer 54 % [3]

[Turn over

10

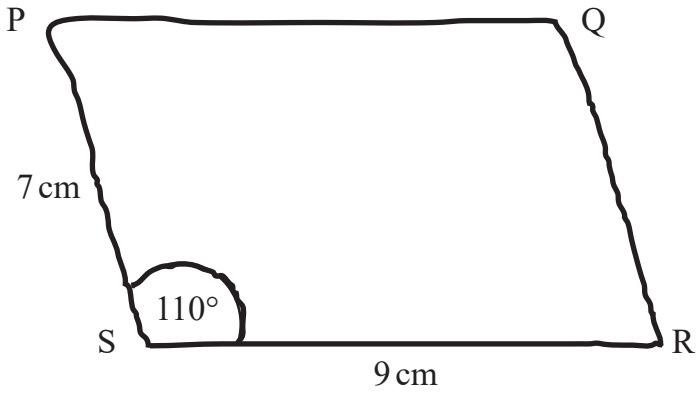


(a) Describe fully the single transformation that maps shape **A** onto shape **B**.

Each vertex moves 3 right and 9 up, e.g. (−2, −3) → (1, 6)

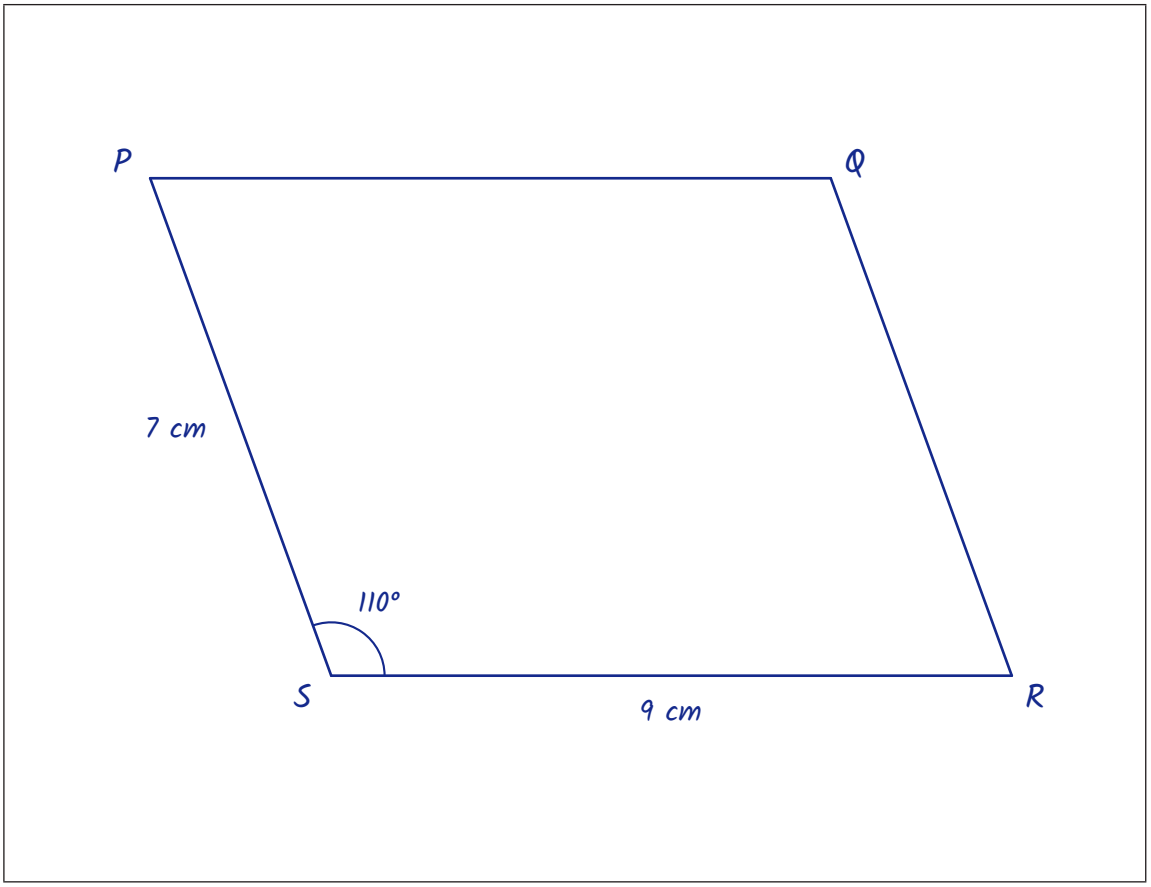
Answer *Translation 3 units right and 9 units up, vector (3, 9)* [2]

(b) A sketch of a parallelogram PQRS is shown.



It is not drawn to scale.

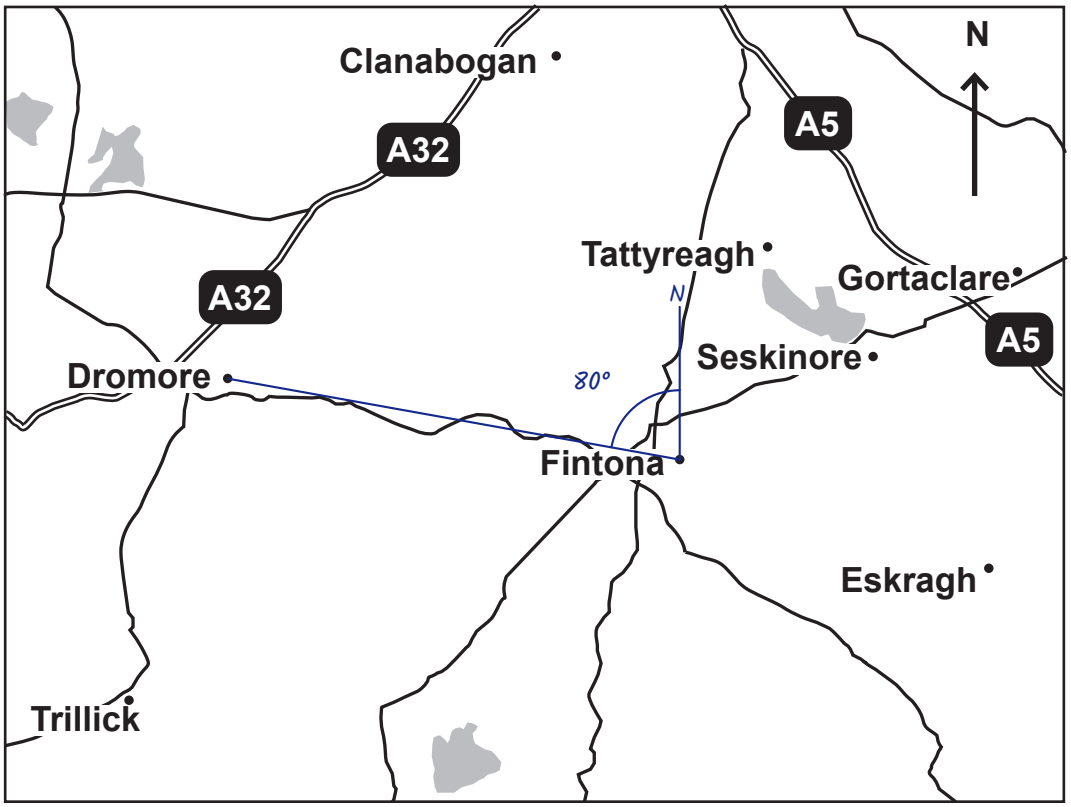
Use a ruler and protractor to draw an accurate diagram of the parallelogram in the box below.



[4]

[Turn over

11



What is the bearing of Dromore from Fintona?

Angle measured anticlockwise from North = 80°
Bearing = 360 − 80 = 280°

Answer *280* ° [1]

12 The first four terms of a sequence are

1, 4, 7, 10
+3 +3 +3

What is the n^{th} term for this sequence?

Goes up in 3s → 3n
3n: 3, 6, 9, 12 then subtract 2

Answer *3n − 2* [2]

13 Tony owns a pizza takeaway.

Every time he sells 100 pizzas, he records the number that were pepperoni.

The table shows some of his data.

Number of pizzas sold	Number of pepperoni pizzas	Relative frequency of pepperoni pizzas
100	17	0.17
100	23	0.2
100	23	0.21
100	25	0.22
100	27	0.23

(a) Complete the table. [4]

After 400 pizzas: 17 + 23 + 23 + 25 = 88 pepperoni

Relative frequency = 88 ÷ 400 = 0.22

After 500 pizzas: 500 × 0.23 = 115 pepperoni

Last 100: 115 − 88 = 27

(b) Tony uses his data to predict next year's pizza sales.

He thinks he will sell 2300 pepperoni pizzas next year.

How many pizzas is he expecting to sell in total?

2300 ÷ 0.23 = 230 000 ÷ 23 = 10 000

Answer 10 000 [1]

[Turn over

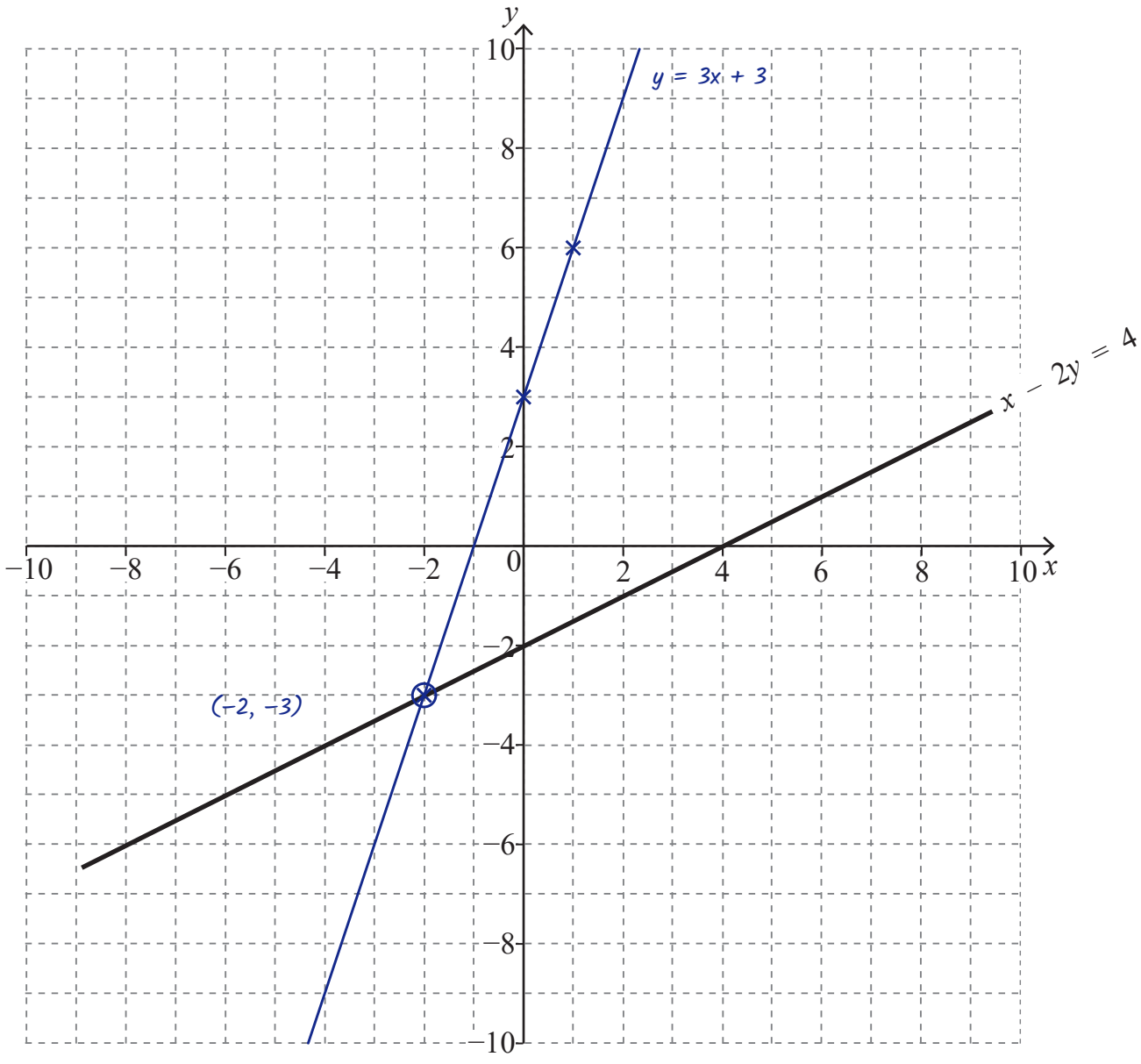
14 By drawing a suitable line on the grid, solve the simultaneous equations

$$x - 2y = 4$$

$$y = 3x + 3$$

$y = 3x + 3$

x:	-2	0	1
y:	-3	3	6



Answer $x =$ -2 $y =$ -3 [4]

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Question Number	**Marks**
1	
2	
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Total Marks	

Examiner Number

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General Certificate of Secondary Education
Summer 2023

GCSE Mathematics

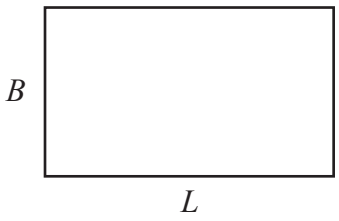
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(For use in Summer 2023)

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$$\text{Average Speed} = \frac{\text{Distance}}{\text{Time}}$$

Perimeter, Area and Volume

The perimeter of a polygon is the distance around the outside of the polygon.



The area of a rectangle is found by multiplying the length of the rectangle by the breadth.

$A = L \times B$, where A is the area, L is length and B is breadth.

The volume of a cuboid is found by multiplying the length by the breadth by the height of the cuboid.

$V = L \times B \times H$ where V is volume, L is length, B is breadth and H is height.

The area of a circle is $A = \pi r^2$ where r is the radius of the circle.

Gradient of Line

$$\text{Gradient of line} = \frac{\text{increase in vertical distance}}{\text{increase in horizontal distance}}$$

Geometry and Angles

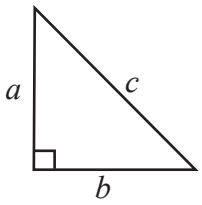
There are 180° on a straight line.
There are 180° inside a triangle.
An isosceles triangle is a triangle with 2 equal sides and 2 equal angles.
The sum of all the angles inside a polygon is given by $180(n - 2)$ where n is the number of sides in the polygon.

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Pythagoras' Theorem

If a, b and c are the sides of a right angled triangle shown below, then

$$a^2 + b^2 = c^2$$



Mean

The mean of a set of data is the sum of all the data values divided by the number of data values.

Estimate for the mean of a grouped frequency distribution

Estimated mean = sum of (mid interval values multiplied by their frequency) divided by the sum of all the frequencies.

Pie Chart

In a pie chart, the total angle that corresponds to the entire data set is 360°

Probability

The sum of the probabilities of all outcomes equals 1

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