

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE MATHEMATICS

Example-Problem Past Paper

F

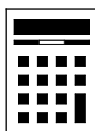
Foundation Tier Paper 2 Calculator

June 2023

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



Second Half

Instructions

- Engage with the fully-worked solutions in full before attempting the shadow questions.
- Explain the fully-worked solutions to yourself, anticipating the next steps in the worked solutions, making links between the problems and the mathematics used to solve them.
- Apply the methods learnt from the fully-worked solutions to the shadow questions, writing down all workings in the spaces provided. Your thought process is important.
- Do all rough work in this book.

Information

- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper.
- You should ask your teacher for help on a question if you do not understand a part of the fully-worked solution. Remember to be specific, understanding why the step was completed, rather than simply getting the correct answer.

Advice

In all calculations, show clearly how you work out your answer.

Where a calculator has been used, show clearly what you entered into the calculator.

13

28 is increased by 25%

40 is decreased by 15%

Which answer is bigger?

Show how you decide.

[4 marks]

$$28 \times 1.25 = 35$$

$$40 \times 0.85 = 34$$

Answer 28 increased by 25%

13

40 is increased by 15%

64 is decreased by 25%

Which answer is bigger?

Show how you decide.

[4 marks]

Answer _____

Turn over ►

14 Factorise $12a + 15b$

[1 mark]

$$2 \times 2 \times 3 \times a + 3 \times 5 \times b = 3(2 \times 2 \times a + 5 \times b)$$

Answer $3(4a + 5b)$

15 Write down all the integers that satisfy the inequality

$$-3 \leq x < 2$$

can be equal to -3 (can not be equal to 2)

[2 marks]

Answer $-3, -2, -1, 0, 1$

16 A linear sequence starts

7 10 13 16

 +3 +3 +3

Work out an expression for the n th term of the sequence.

[2 marks]

$$\begin{array}{cccc} 3n & = & 3 & 6 & 9 & 12 \\ 3n+4 & = & 7 & 10 & 13 & 16 \end{array}$$

Answer $3n + 4$

14 Factorise $14x + 21y$

[1 mark]

Answer _____

15 Write down all the integers that satisfy the inequality

$$-1 \leq x < 4$$

[2 marks]

Answer _____

16 A linear sequence starts

7 12 17 22

Work out an expression for the n th term of the sequence.

[2 marks]

Answer _____

17

Jess saves 2p, 5p and 10p coins.

She has

- 45 10p coins
- 8 times as many 2p coins as **10p coins**
- £17.70 in total.

Work out total **value** of 2p coins : total **value** of 5p coins

Give your answer in its simplest form.

[4 marks]

$$45 \times 10p = £4.50 \quad (10p \text{ coins})$$

$$8 \times 45 = 360 \quad 360 \times 2p = £7.20 \quad (2p \text{ coins})$$

$$4.50 + 7.20 = 11.70 \quad 17.70 - 11.70 = £6.00 \quad (5p \text{ coins})$$

$$£7.20 : £6.00$$

$$\div 10 \downarrow 720p : 600p \downarrow \div 10$$

$$\div 12 \downarrow 72 : 60 \downarrow \div 12$$

$$6 : 5$$

Answer 6 : 5

She has

- 35 10p coins
- 9 times as many 2p coins as **10p coins**
- £14.30 in total.

Give your answer in its simplest form.

[4 marks]

Answer _____ :

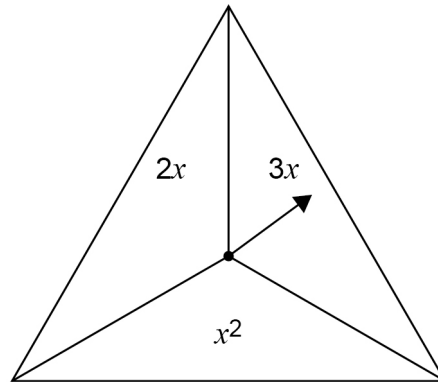
4

Turn over ►

18

In a game,

- an ordinary fair six-sided dice is rolled
- the fair spinner shown is spun.



The score is the dice number **substituted** into the spinner expression.

18 (a) Complete the table to show all of the possible scores.

[2 marks]

	1	2	3	4	5	6
$2x$	2	4	6	8	10 ✓	12 ✓
$3x$	3	6	9	12 ✓	15 ✓	18 ✓
x^2	1	4	9	16 ✓	25 ✓	36 ✓

- 18 (b)** A player wins the game if their score is 10 or more.

Work out the probability that they win the game.

[1 mark]

8 scores of 10 or more.

18 scores

Answer $\frac{8}{18} = \frac{4}{9}$

- 18 (c)** The game is played 711 times.

Estimate the number of games that are won.

[2 marks]

$\frac{4}{9} \times 711 = 316$

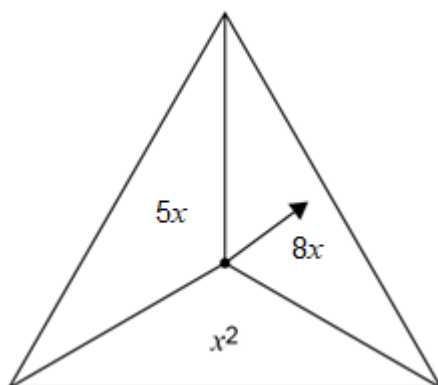
Answer 316

Turn over ►

18

In a game,

- an ordinary fair six-sided dice is rolled
- the fair spinner shown is spun.



The score is the dice number **substituted** into the spinner expression.

18 (a)

Complete the table to show all of the possible scores.

[2 marks]

	1	2	3	4	5	6
$5x$						30
$8x$		16				
x^2				16		

- 18 (b)** A player wins the game if their score is 30 or more.

Work out the probability that they win the game.

[1 mark]

Answer _____

- 18 (c)** The game is played 756 times.

Estimate the number of games that are won.

[2 marks]

Answer _____

- 19 (a) Part of a regular polygon is shown.



Not drawn
accurately

Assume that the polygon is an octagon. (8 angles)

Work out the size of angle x .

[2 marks]

Exterior angles add up to 360°

$$360 \div 8 = 45$$

Answer 45 °

- 19 (b) In fact, the polygon has **more** sides than an octagon.

What does this mean about the size of angle x ?

Tick **one** box.

[1 mark]

☐

It is more than the answer to part (a)

☐

It is the same as the answer to part (a)

☒

It is less than the answer to part (a)

☐

It could be any of the above

- 19 (a)** Part of a regular polygon is shown.



Not drawn
accurately

Assume that the polygon is a hexagon.

Work out the size of angle x .

[2 marks]

Answer _____ °

- 19 (b)** In fact, the polygon has **fewer** sides than a hexagon.

What does this mean about the size of angle x ?

Tick **one** box.

[1 mark]

☐

It is more than the answer to part (a)

☐

It is the same as the answer to part (a)

☐

It is less than the answer to part (a)

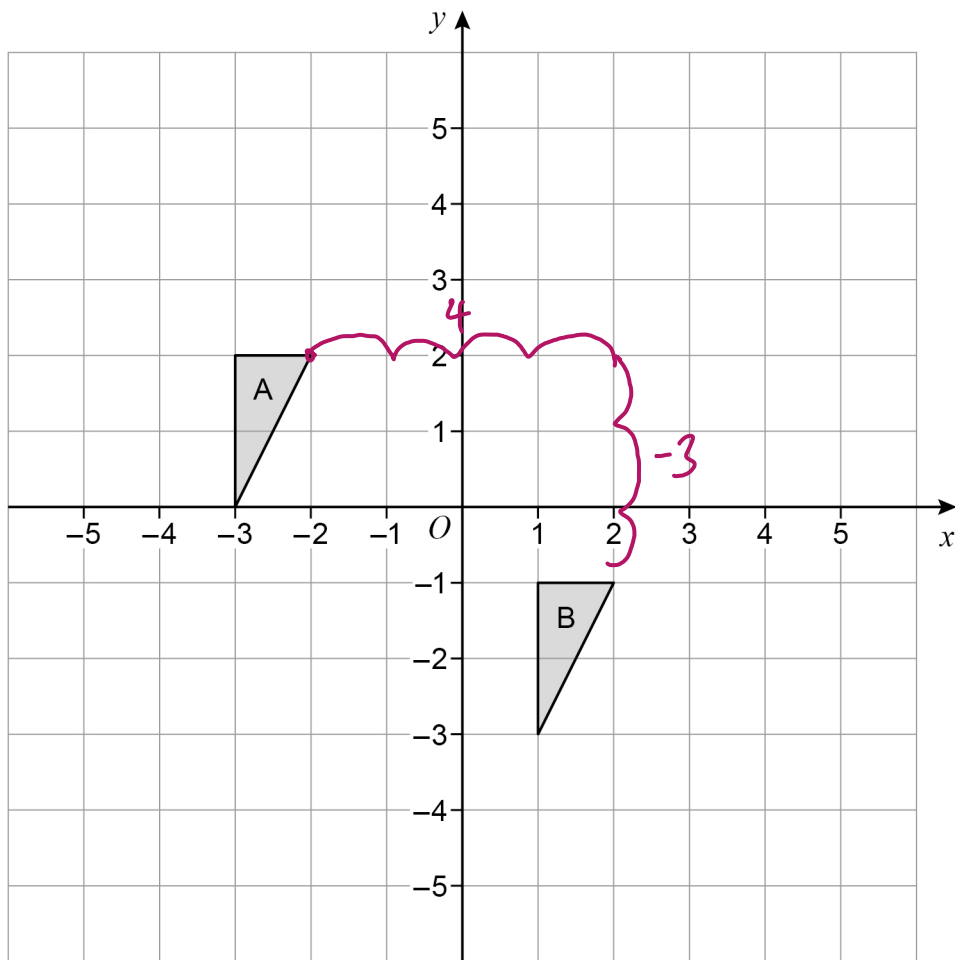
☐

It could be any of the above

Turn over ►

20

Write down the translation vector that maps shape A onto shape B.

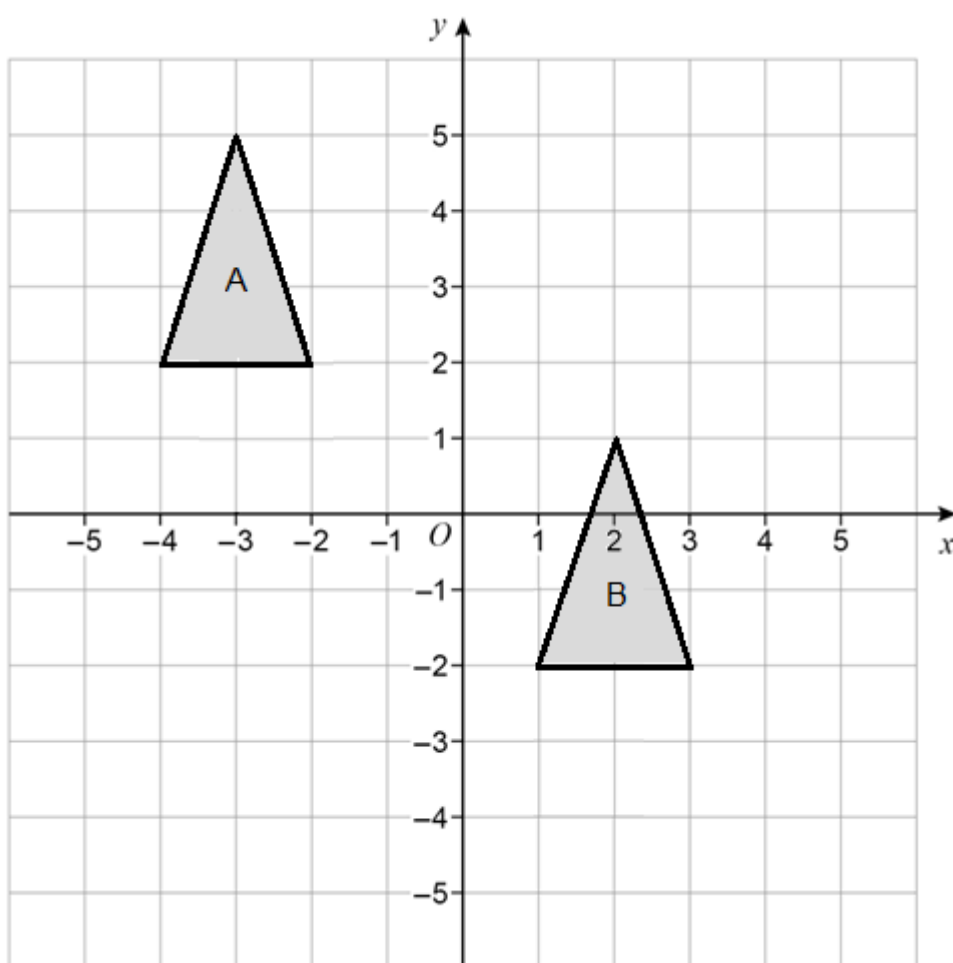
[2 marks]

Answer _____

 $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

20

Write down the translation vector that maps shape A onto shape B.

[2 marks]

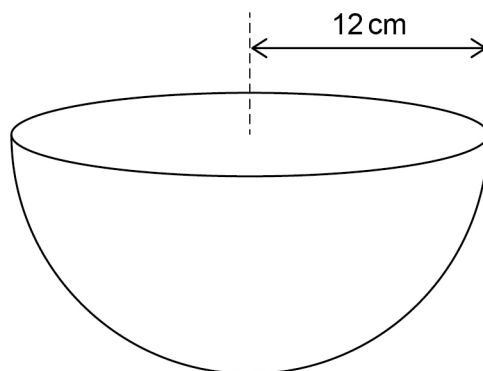
Answer _____

Turn over ►

21

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

A bowl is a hemisphere with radius 12 cm



Water is poured into the bowl
at a rate of 325 cm^3 per second
for 8 seconds.

Does the water fill **more than** 70% of the bowl?

You **must** show your working.

[4 marks]

$$325 \text{ cm}^3/\text{s} \times 8 \text{ s} = 2600 \text{ cm}^3 \text{ (water)}$$

$$\frac{4}{3} \times \pi \times 12^3 = 7,238.229473871$$

$$7,238.229473871 \div 2 = 3,619.114736935 \text{ (volume of the bowl)}$$

$$3,619.114736935 \times 0.7 = 2,533.380315855 \text{ cm}^3$$

$$\text{Yes. } 2600 > 2533.38$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

A diagram of a hemispherical bowl. A vertical dashed line extends from the center of the circular rim to the bottom of the bowl. A horizontal double-headed arrow indicates the radius from this dashed line to the rim, labeled "9 cm".

Does the water fill **more than** 80% of the bowl?
You **must** show your working.

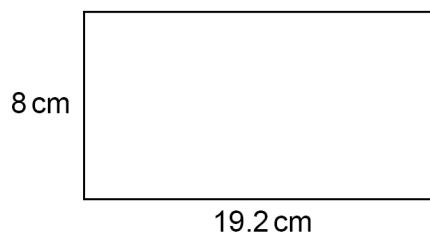
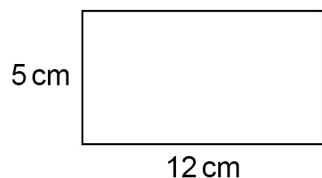
[4 marks]

4

Turn over ►

22

Show that these two rectangles are similar.

[2 marks]Not drawn
accurately

$$\frac{8}{5} = 1.6 \quad \frac{19.2}{12} = 1.6$$

$$\text{Scale factor} = 1.6$$

23

A factory packs x boxes of teabags per hour.

Each box contains 80 teabags.

Show that the factory packs $\frac{4x}{3}$ teabags per minute.**[2 marks]**

$$80 \times x = 80x \text{ teabags per hour}$$

$$80x \div 60 = \text{tea bags per minute}$$

$$\frac{80x}{60} = \frac{4x}{3}$$

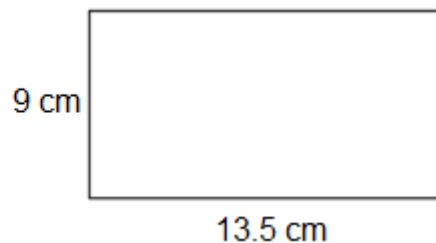
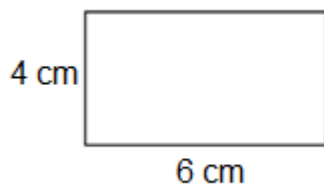
$\xrightarrow{\div 20}$
 $\xleftarrow{\div 20}$

22

Show that these two rectangles are similar.

[2 marks]

Not drawn
accurately



23

A factory packs x boxes of plasters per hour.

Each box contains 100 plasters.

Show that the factory packs $\frac{5x}{3}$ plasters per minute.

[2 marks]

END OF QUESTIONS

Do not write
outside the
box

[illegible]