# AQA

# GCSE
# MATHEMATICS

**F**

Foundation Tier    Paper 2  Calculator
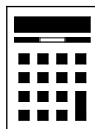
Thursday 7 June 2018        Morning        Time allowed: 1 hour 30 minutes

## Materials

**For this paper you must have:**
- a calculator
- mathematical instruments.

## Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

## Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

## Advice

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

Answer **all** questions in the spaces provided

**1**    Circle the expression that can be written as     $2y$

**[1 mark]**

$y + y$          $y^2$          $2 + y$          $y \times y$

**2**    Circle the decimal that is greater than $\dfrac{3}{10}$ and less than $\dfrac{2}{5}$

**[1 mark]**

0.32          0.035          0.4          0.24

**3**    What is 625 as a power of 5 ?
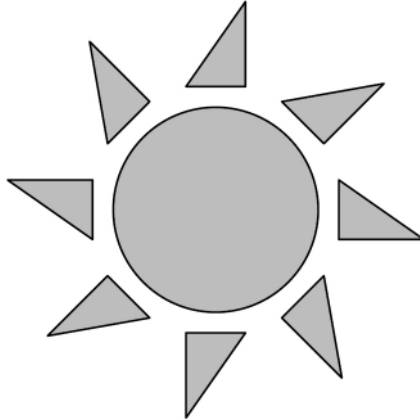
Circle your answer.

**[1 mark]**

$5^3$          $5^4$          $5^5$          $5^{125}$

**4** Circle the order of rotational symmetry of this drawing.



[1 mark]

| 0 | 2 | 4 | 8 |

**5** Work out the value of $3^6 - \sqrt{841}$

[2 marks]

Answer _____

**Turn over for the next question**

6

**Turn over ▶**

**6** Gemma has four groups of friends on a social media site.

The table shows the number of friends in each group.

| Group | Number of friends |
|---|---|
| Family | 8 |
| Netball | 8 |
| School | 26 |
| Guides | 11 |

**6 (a)** Which group is the mode?

[1 mark]

Answer _____

**6 (b)** Gemma wants a pictogram to show the information.

She has drawn the first two rows.

Complete the pictogram.

Remember to complete the key.

[3 marks]

**Key**: ◯ represents _____ friends

| Family | ◯ ◯ |
|---|---|
| Netball | ◯ ◯ |
| School | |
| Guides | |

**7**     $e$ is 3 **more** than $d$.

$f$ is 5 **less** than $d$.

**7**  **(a)**  Write an expression for $e$ in terms of $d$.

**[1 mark]**

Answer _____

**7**  **(b)**  Write an expression for $f$ in terms of $d$.

**[1 mark]**

Answer _____

**7**  **(c)**  Work out     $e - f$

Simplify your answer.

**[2 marks]**

_____

_____

_____

Answer _____

**Turn over for the next question**

8

**Turn over ▶**

0 5

**8** The numbers 1 to 12 are put in a grid.

2, 4, 5, 7, 10 and 12 are shown.

|  |  | 5 | 10 |
|---|---|---|---|
| 12 |  |  |  |
| 4 |  |  |  |
| 7 |  | 2 |  |

Each of the four sides of the grid must add up to 26

Complete the grid using the numbers

1, 3, 6, 8, 9 and 11

**[3 marks]**

**9** In this question, use

1 foot = 12 inches

1 inch = 2.5 centimetres

Change 5 feet 8 inches to centimetres.

**[3 marks]**

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____ cm

**10** Which of these numbers has **exactly four** factors?

Circle your answer.

**[1 mark]**

4 8 12 16

**Turn over for the next question**

**7**

**Turn over ▶**

**11** Nick has a 6-digit code.

He remembers it as three 2-digit numbers.

The first number is between 10 and 20

The second number is 3 times the first number.

The third number is 5 times the first number.

All six digits are **different**.

Work out the code.

**[3 marks]**

_____

_____

_____

_____

_____

_____

_____

Answer _____ _____ _____ _____ _____ _____

**12** How many minutes are there in $5\frac{1}{4}$ hours?

Circle your answer.

**[1 mark]**

315        325        515        525

**13** Here is a formula for the amount of water needed to cook rice.

$$w = 1.5r + 0.5$$

$w$ is the number of cups of water needed

$r$ is the number of cups of rice to be cooked

**13 (a)** How many cups of water are needed to cook 7 cups of rice?

[2 marks]

Answer

**13 (b)** How many cups of rice can be cooked with 20 cups of water?

[3 marks]

Answer

**Turn over for the next question**

9

**Turn over ▶**

**14 (a)** Use your calculator to work out $9.95^2 \times 29.8$

Give your answer as a decimal.

Write down your full calculator display.

[1 mark]

Answer _____

**14 (b)** Is your answer to part (a) sensible?

Use approximations to decide.

You **must** show your working.
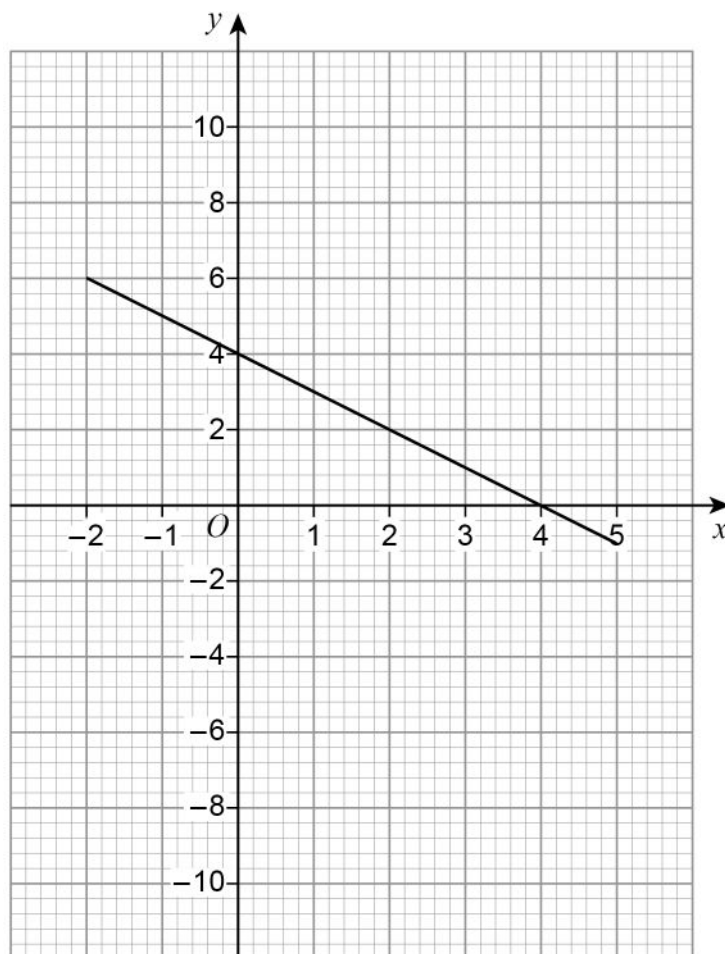
[3 marks]

Tick a box.

☐ Sensible      ☐ Not sensible

**15** The graph of $y = 4 - x$ for values of $x$ from –2 to 5 is shown on the grid.

**15 (a)** On the grid, draw the graph of $y = 2x - 5$ for values of $x$ from –2 to 5

**[3 marks]**
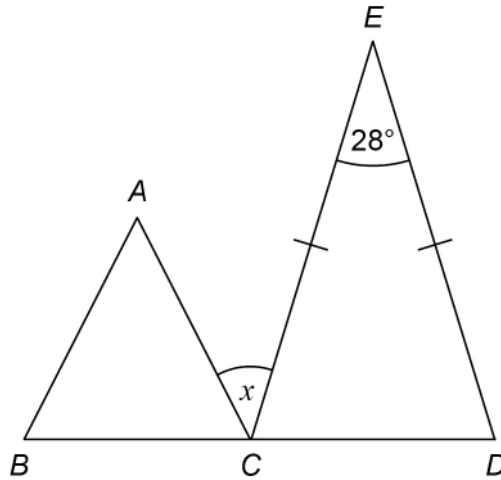


**15 (b)** Use your graph to solve $2x - 5 = 4 - x$

**[1 mark]**

$x =$ _____

**Turn over ▶**

**16 (a)** *BCD* is a straight line.

Triangle *ABC* is equilateral.

*CE = DE*

Not drawn accurately



Work out the size of angle $x$.

**[4 marks]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____ degrees

**16 (b)** Amba is working out the size of an **interior** angle of a regular octagon.
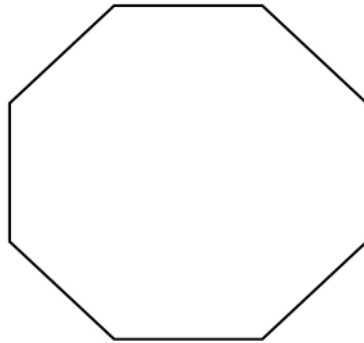
Not drawn accurately

Her method is    Interior angle = 360 ÷ 8

Is her method correct?

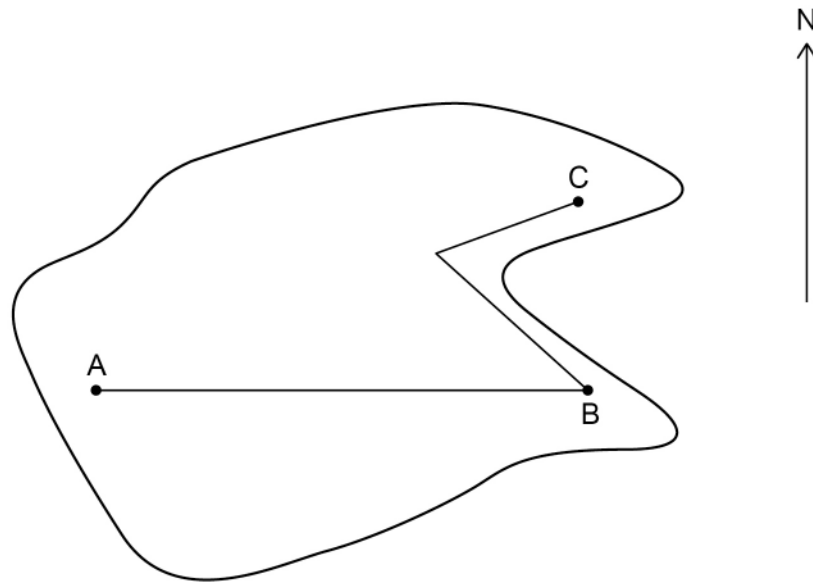Tick a box.

☐ Yes        ☐ No

Give a reason for your answer.

**[1 mark]**

_____

_____

_____

**Turn over for the next question**

5

**Turn over ▶**

**17** Here is a map of an island with cities A, B and C.

The straight lines represent roads.

**Scale**: 1 cm represents 200 km

N



**17 (a)** A is due West of B.

Write down the bearing of A from B.

**[1 mark]**

Answer _____ °

**17 (b)** Umar drives from A to B on the route shown.

Kaz drives from B to C on the route shown.

Use the map to work out how much further Umar drives than Kaz.

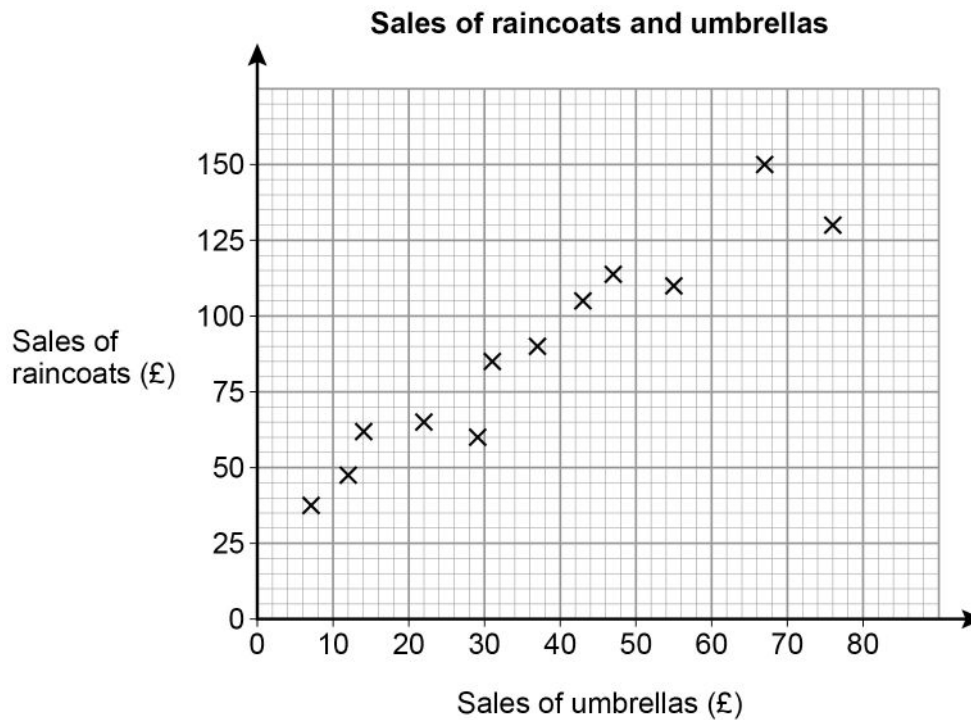You **must** show your working.

[5 marks]

Answer _____ km

**Turn over for the next question**

6

**18** A shop sells raincoats and umbrellas.

The scatter graph shows the monthly sales for 12 months.

**Sales of raincoats and umbrellas**



**18 (a)** Write down the type of correlation shown by the graph.

[1 mark]

Answer _____

**18 (b)** The manager expects the sales of umbrellas next month to be £60

Draw a line of best fit to estimate the sales of raincoats next month.

[3 marks]

Answer £_____

**19**   Multiply out   $x(x-4)$

Circle your answer.

**[1 mark]**

$x^2 - 4$          $2x - 4$          $x^2 - 4x$          $-3x^2$

**20**   $a : b = 5 : 2$

How many times larger is $a$ than $b$?

Circle your answer.

**[1 mark]**

0.4               1.5               2.5               3

**6**

**Turn over ▶**

**21 (a)** A circle has radius 4.2 cm

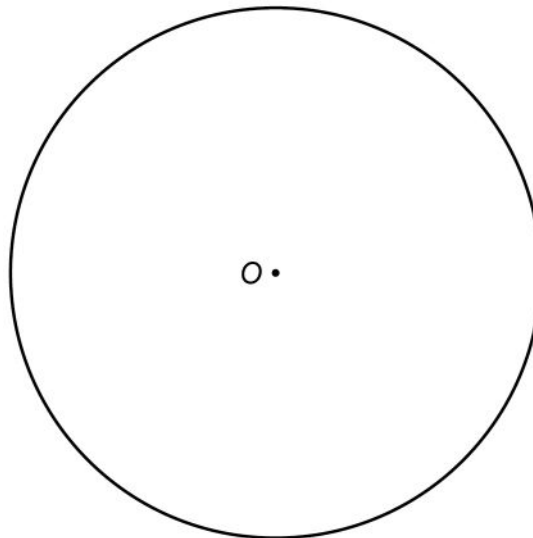Work out the length of the circumference.
Give your answer to 1 decimal place.

**[3 marks]**

Answer _____ cm

**21 (b)** The circle below has centre *O*.
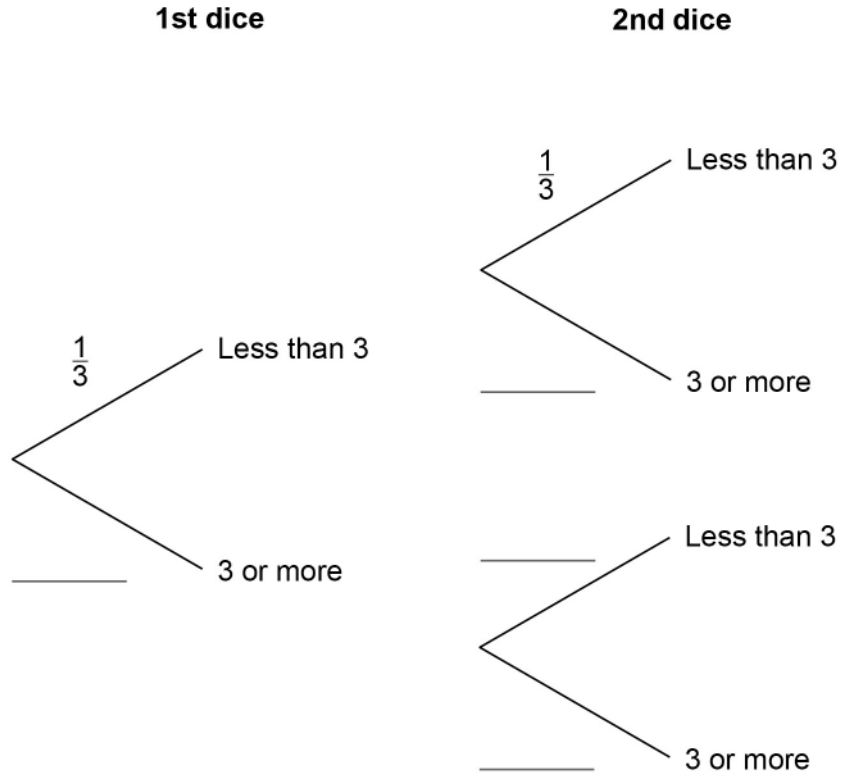
Draw a sector on the circle.

**[1 mark]**

**22** Two ordinary fair dice are rolled.

**22 (a)** Complete the tree diagram.

[1 mark]

**1st dice**                      **2nd dice**

$\frac{1}{3}$ — Less than 3

_____ 3 or more

$\frac{1}{3}$ — Less than 3

_____ 3 or more

_____ Less than 3

_____ 3 or more

**22 (b)** Work out the probability that **both** dice land on a number less than 3

[1 mark]

_____

_____

Answer _____

**Turn over for the next question**

**Turn over ▶**

**23** Match each sequence to its description.

One has been done for you.

**[4 marks]**

| | |
|---|---|
| 1  1  2  3  5  8 | Arithmetic progression |
| 1  2  4  8  16  32 | Geometric progression |
| 1  2  3  4  5  6 | Fibonacci sequence |
| 1  3  6  10  15  21 | Triangular numbers |
| 1  4  9  16  25  36 | Cube numbers |
| 1  8  27  64  125  216 | Square numbers |

**24** The table shows information about the population of a city.

| Population in 2001 | Population in 2011 |
|---|---|
| 420 000 | 480 000 |

Liam claims,

"From 2011 to 2021 the population of the city will increase by the same percentage as from 2001 to 2011"

He works out,

population increase from 2001 to 2011 = 480 000 – 420 000

= 60 000

population in 2021 = 480 000 + 60 000

= 540 000

Does the population of 540 000 match his claim?

You **must** show your working.

**[3 marks]**

Answer _____

**7**

**Turn over ▶**

**25** On three days, Ali throws darts at a target.

Here are his results.

|  | **Number of throws** | **Number of hits** | **Number of misses** |
|---|---|---|---|
| **Monday** | 20 | 15 | 5 |
| **Tuesday** | 30 | 22 | 8 |
| **Wednesday** | 40 | 17 | 23 |
| **Total** | 90 | 54 | 36 |

**25 (a)** Work out **two** different estimates for the probability of Ali hitting the target.

[2 marks]

Answer _____ and _____

**25 (b)** Which of your two answers is the better estimate for the probability of Ali hitting the target?

Give a reason for your answer.

[1 mark]

Answer _____

Reason _____

**26** Theo starts with savings of £18

James starts with no savings.

Each week from now,

Theo will save £4.50   and   James will save £4

In how many weeks will Theo and James have savings in the ratio 15 : 8 ?

**[3 marks]**

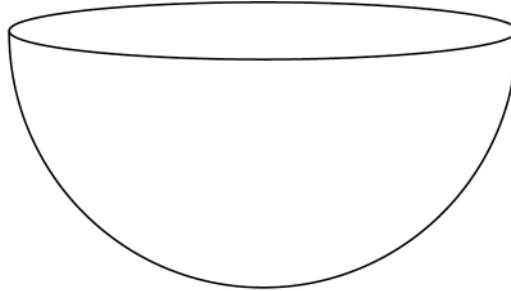Answer _____

**Turn over for the next question**

**Turn over ▶**

6

**27**

| Volume of a sphere = $\frac{4}{3}\pi r^3$   where $r$ is the radius |

A container is a hemisphere of radius 30 cm



Sand fills the container at a rate of 4000 cm$^3$ per minute.

Does it take **less than** a quarter of an hour to fill the container?

You **must** show your working.

[3 marks]

Answer _____

**28** The length of each side of a regular pentagon is 8.4 cm to 1 decimal place.

**28 (a)** Complete the error interval for the length of one side.

**[2 marks]**

_____ cm ⩽ length < _____ cm

**28 (b)** Complete the error interval for the perimeter.

**[1 mark]**

_____ cm ⩽ perimeter < _____ cm

**END OF QUESTIONS**

**6**

**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE**
**ANSWER IN THE SPACES PROVIDED**

**There are no questions printed on this page**

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

**There are no questions printed on this page**

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED