



Please write clearly in block capitals.

Centre number

Candidate number

Surname \_\_\_\_\_

Forename(s) \_\_\_\_\_

Candidate signature \_\_\_\_\_

# 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.

### For Examiner's Use

Pages	Mark
2-3	
4-5	
6-7	
8-9	
10-11	
12-13	
14-15	
16-17	
18-19	
20-21	
22-23	
24-25	
<b>TOTAL</b>	

### Advice

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



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Answer all questions in the spaces provided

Do not write  
outside the  
box

- 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  $\frac{3}{10}$  and less than  $\frac{2}{5}$  [1 mark]

0.3

0.4

0.32

0.035

0.4

0.24

- 3 What is 625 as a power of 5 ?  
Circle your answer. [1 mark]

$5^3$

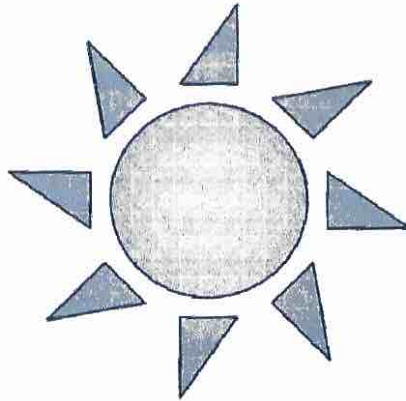
$5^4$

$5^5$

$5^{125}$



- 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]

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Answer 700

Turn over for the next question

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 School

- 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 4 friends

Family	○ ○
Netball	○ ○
School	○ ○ ○ ○ ○ ○ ○
Guides	○ ○ G



- 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 ~~///~~  $d+3$

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

[1 mark]

Answer ~~///~~  $d-5$

- 7 (c) Work out  $e-f$   
Simplify your answer.

[2 marks]

$$\cancel{d}+3 - (\cancel{d}-5)$$

$$3 - (-5) = 8$$

Answer 8

Turn over for the next question

Turn over ►



- 8 The numbers 1 to 12 are put in a grid.  
2, 4, 5, 7, 10 and 12 are shown.

3	8	5	10
12			9
4			1
7	11	2	6

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]

$$5 \times 12 = 60 \text{ inches} \quad 60 \times 2.5 = 150 \text{ cm}$$

+

$$8 \times 2.5 = 20 \text{ cm}$$

$$150 + 20 = 170$$

Answer 170 cm

10

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

Circle your answer.

[1 mark]

4

8

12

16

 1 8  
 2 4

Turn over for the next question

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]

First	$\times 3$	Second	Third
12		36	60
13		39	
14		42	
15		45	
16		48	80
17		51	
18		54	90
Answer	18	54	90

12

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

Circle your answer.

[1 mark]

315

325

515

525

$$5 \times 60 = 300$$

$$\frac{1}{4} \times 60 = 15$$





- 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]

$$1.5 \times 7 + 0.5$$

$$10.5 + 0.5 = 11$$

Answer 11

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

[3 marks]

$$20 = 1.5r + 0.5$$

$$-0.5 \quad -0.5$$

$$19.5 = 1.5r$$

$$\div 1.5 \quad \div 1.5$$

$$r = 13$$

Answer 13

Turn over for the next question



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 2950.2745

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

Use approximations to decide.

You must show your working.

[3 marks]

$$\begin{array}{l} 9.95^2 \rightarrow 10^2 \quad 10^2 \times 30 = \\ 29.8 \rightarrow 30 \quad 100 \times 30 = \underline{3000} \end{array}$$

3000 is close to 2950.2745

Tick a box.

Sensible

Not sensible

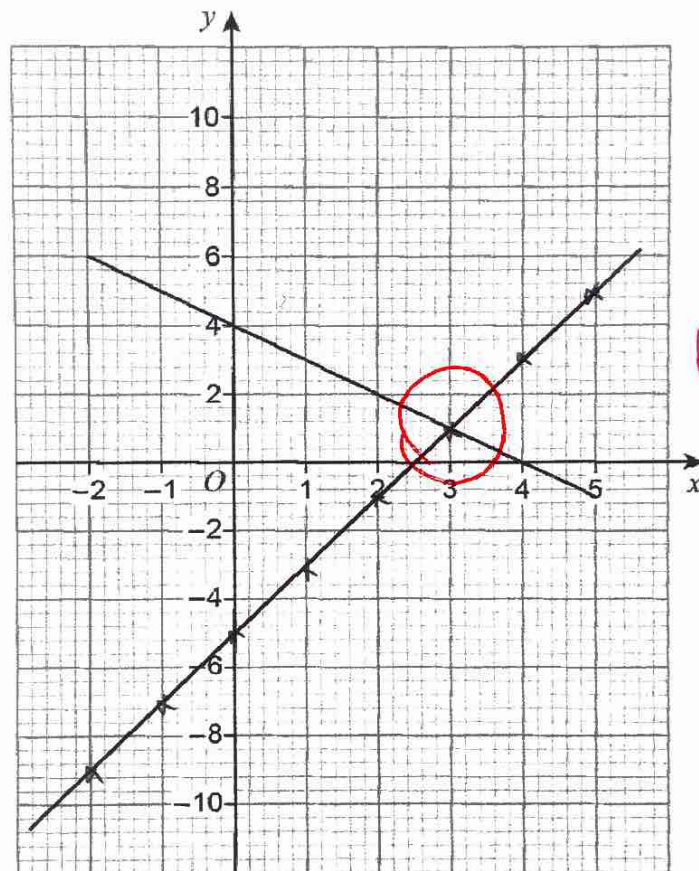


15 The graph of  $y = 4 - x$  for values of  $x$  from  $-2$  to  $5$  is shown on the grid.

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

[3 marks]

$x$	-2	-1	0	1	2	3	4	5
$y$	-9	-7	-5	-3	-1	1	3	5

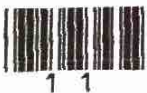


$(3, 1)$   
 $x = 3$   
 $y = 1$

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

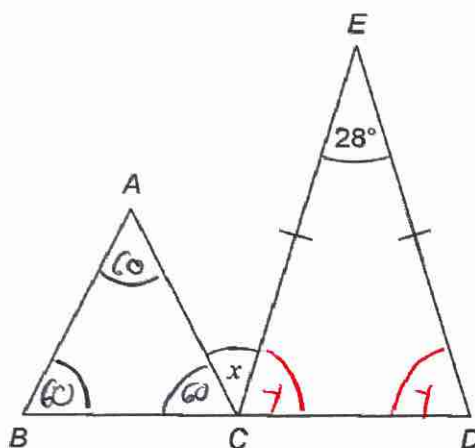
[1 mark]

$x =$  3



- 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]

$$2y + 28 = 180$$

Angle = 60 w equilateral triangle

$$2y = 152$$

$$y = 76$$

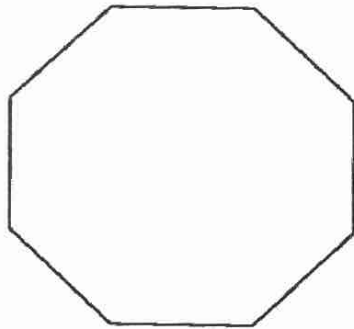
$$x + 76 + 60 = 180$$

$$x = 44^\circ$$

Answer 44 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 =  $360 \div 8$

Is her method correct?

Tick a box.

Yes

No

Give a reason for your answer.

[1 mark]

$$\frac{360}{n} = \frac{360}{8} \text{ is for the exterior angle}$$

$$\text{It should be } 180 - (360 \div 8)$$

Turn over for the next question

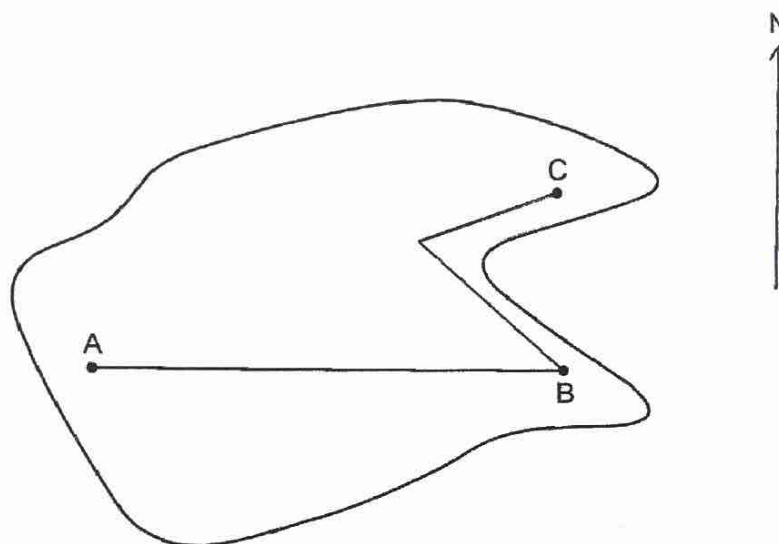


$$\frac{360}{8} = \ominus$$



- 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



- 17 (a) A is due West of B.  
Write down the bearing of A from B.

[1 mark]

Answer 270 °





- 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]

$$A \rightarrow B = 6.5 \text{ cm} \times 200 = 1300 \text{ km}$$

$$2.7 \times 200 = 540 \text{ km}$$

$$2 \times 200 = 400 \text{ km}$$

$$1300 - (540 + 400) = 360 \text{ km}$$

Answer 360 km km

Turn over for the next question

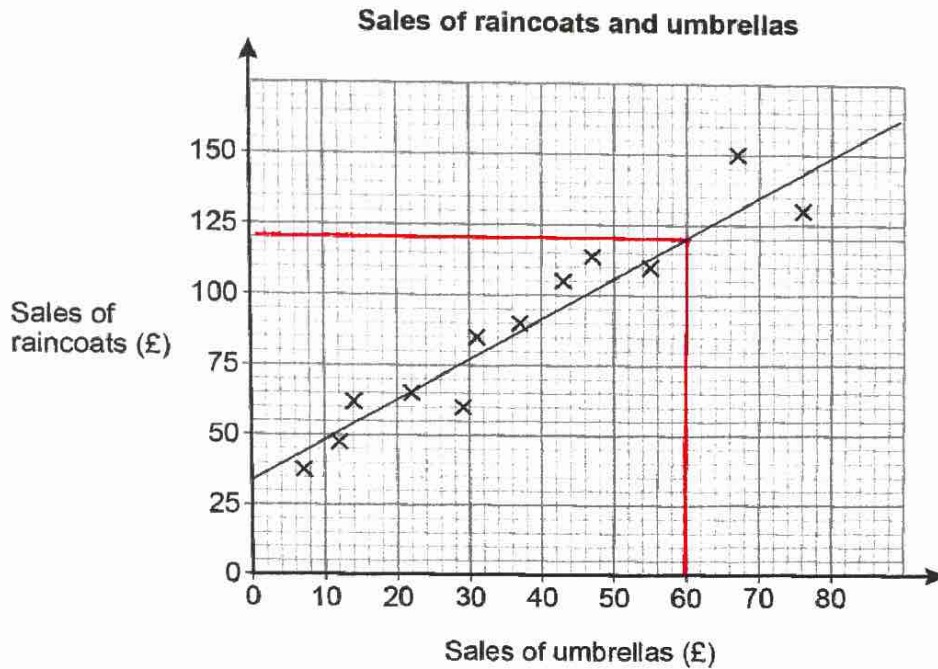
Turn over ►



18

A shop sells raincoats and umbrellas.

The scatter graph shows the monthly sales for 12 months.



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

[1 mark]

Answer positive

- 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 £ ~ 120



- 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

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]

$$\text{Radius} = 4.2$$

$$\text{Diameter} = 8.4$$

$$\text{Circumference} = \pi D$$

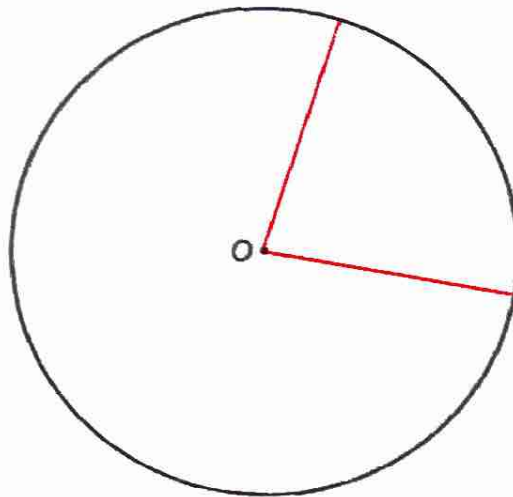
$$\pi \times 8.4 = 26.4 \text{ 2dp}$$

Answer 26.4 cm

- 21 (b) The circle below has centre O.

Draw a sector on the circle.

[1 mark]



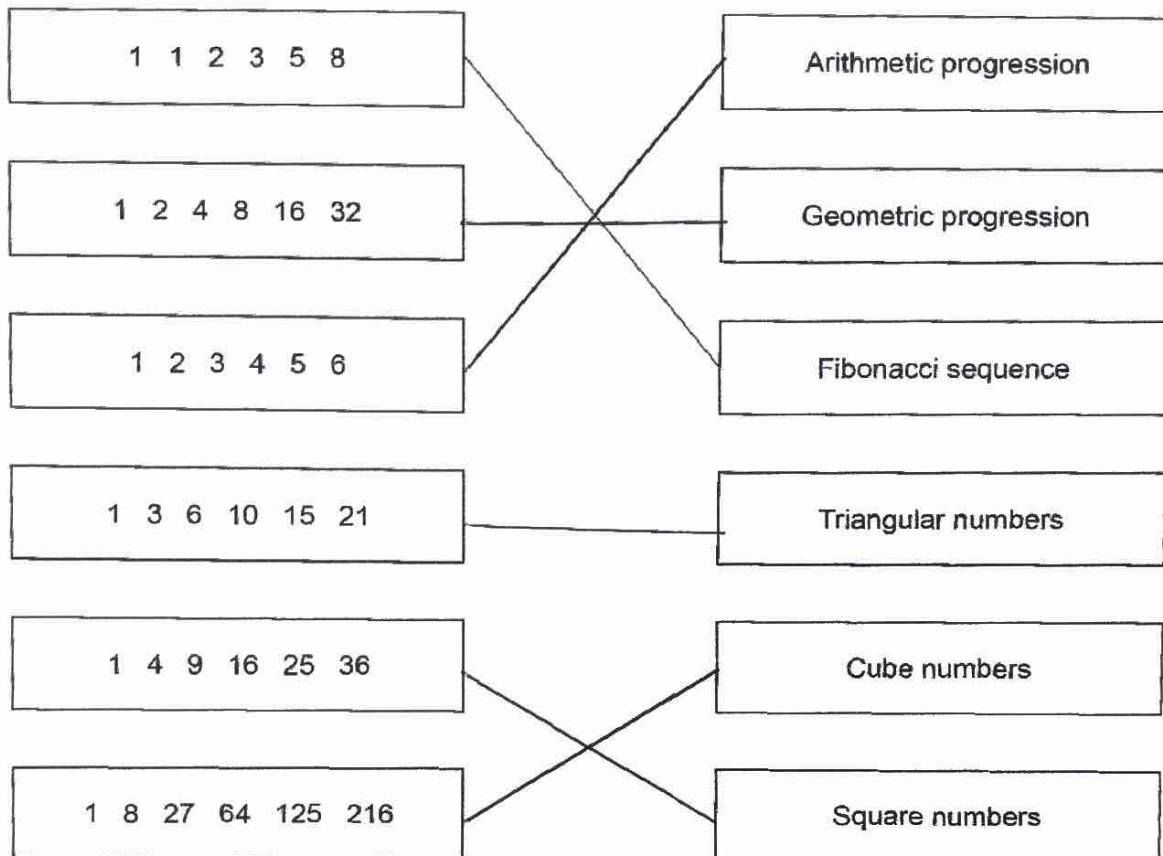


23

Match each sequence to its description.

One has been done for you.

[4 marks]





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,

$$\begin{aligned} \text{population increase from 2001 to 2011} &= 480\,000 - 420\,000 \\ &= 60\,000 \end{aligned}$$

$$\begin{aligned} \text{population in 2021} &= 480\,000 + 60\,000 \\ &= 540\,000 \end{aligned}$$

Does the population of 540 000 match his claim?

You must show your working.

[3 marks]

NO

$$\frac{60000}{420000} = \frac{1}{7} = 14\% \text{ ish}$$

$$\frac{60,000}{480,000} = \frac{1}{8} = 12.5\%$$

$$\text{Ans. } 12.5\% < 14\%$$

$\therefore$  The percentage increase is smaller

Answer NO

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]

$$\frac{15}{20} = 75\%$$

$$\frac{17}{40} = 42.5\%$$

Answer 75% and 42.5%

- 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 42.5%

Reason It has the largest sample size  
40 > 20



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]

	Theo	James		
1	18	0	4.5	= 24
2	22.50	4	15	: 8
3	27.00	8		
4	31.50	12		
5	36.00	16		
6	40.50	20		
	45.00	24		

Answer 6 weeks

Turn over for the next question

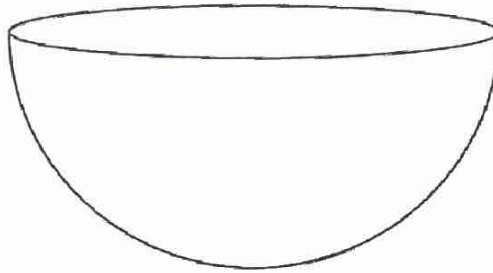
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27

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  $4000 \text{ cm}^3$  per minute.

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

You **must** show your working.

[3 marks]

$$\text{Volume} = \left( \frac{4}{3} \times \pi \times 30^3 \right) \div 2 = 18000\pi$$

$$\frac{18000\pi}{4000} = 14.137 \text{ mins}$$

yes less than 15 mins

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]

$$\frac{0.1}{2} = 0.05 \quad 0.05 - 8.4 + 0.05$$

$$\underline{8.35} \text{ cm} < \text{length} < \underline{8.45} \text{ cm}$$

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

[1 mark]

$$\underline{8.35} \times 5 = \quad \underline{8.45} \times 5 =$$

$$\underline{41.75} \text{ cm} < \text{perimeter} < \underline{42.25} \text{ cm}$$

END OF QUESTIONS

