AQA

.CG Maths.
Hints

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
MATHEMATICS

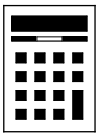
F

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.

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

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	
TOTAL	

Please note that these worked solutions have neither been provided nor approved by AQA and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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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]

$y + y$ $\quad$ ~~y^2~~ $\quad$ ~~$2 + y$~~ $\quad$ $y \times y$

These cannot be simplified and are not 2y

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

[1 mark]

0.32 $\quad$ 0.035 $\quad$ 0.4 $\quad$ 0.24

Convert the fractions into decimals by typing them into the calculator, pressing =, then the SD button

3 What is 625 as a power of 5 ?

Circle your answer.

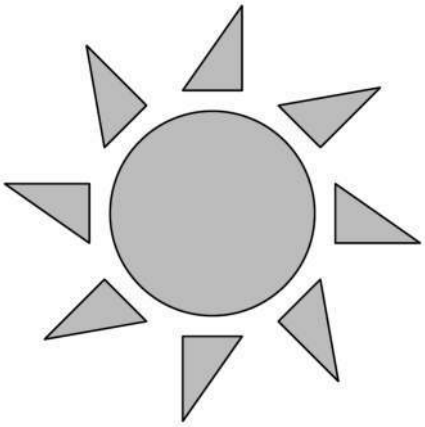
[1 mark]

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

Type each of these into the calculator until there is one which equals to 625

Do not write outside the box

4 Circle the order of rotational symmetry of this drawing.



[1 mark]

0 2 4 8

The order of rotational symmetry is the number of times the drawing can be rotated to look the same within 360°

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

[2 marks]

Type it into the calculator exactly as it is above

Answer _____

Turn over for the next question

6

Do not write outside the box

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 _____

The group which had the greatest number of friends is the mode as this will be the one which is most frequent

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]

There are 8 friends in Family and this is represented by 2 symbols. 8/2 = 4 so each symbol must represent 4 friends

Key: ◯ represents 4 friends

Family	◯ ◯
Netball	◯ ◯
School	
Guides	

Dividing the number of friends in School and Guides by 4 then converting into a mixed fraction works out how many symbols should be drawn

To convert into a mixed fraction press SHIFT then the SD button

Do not write outside the box

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 _____

7 (c) Work out $e - f$

Simplify your answer.

[2 marks]

Expressing both e and f in terms of d then subtracting them allows it to be simplified easier

Answer _____

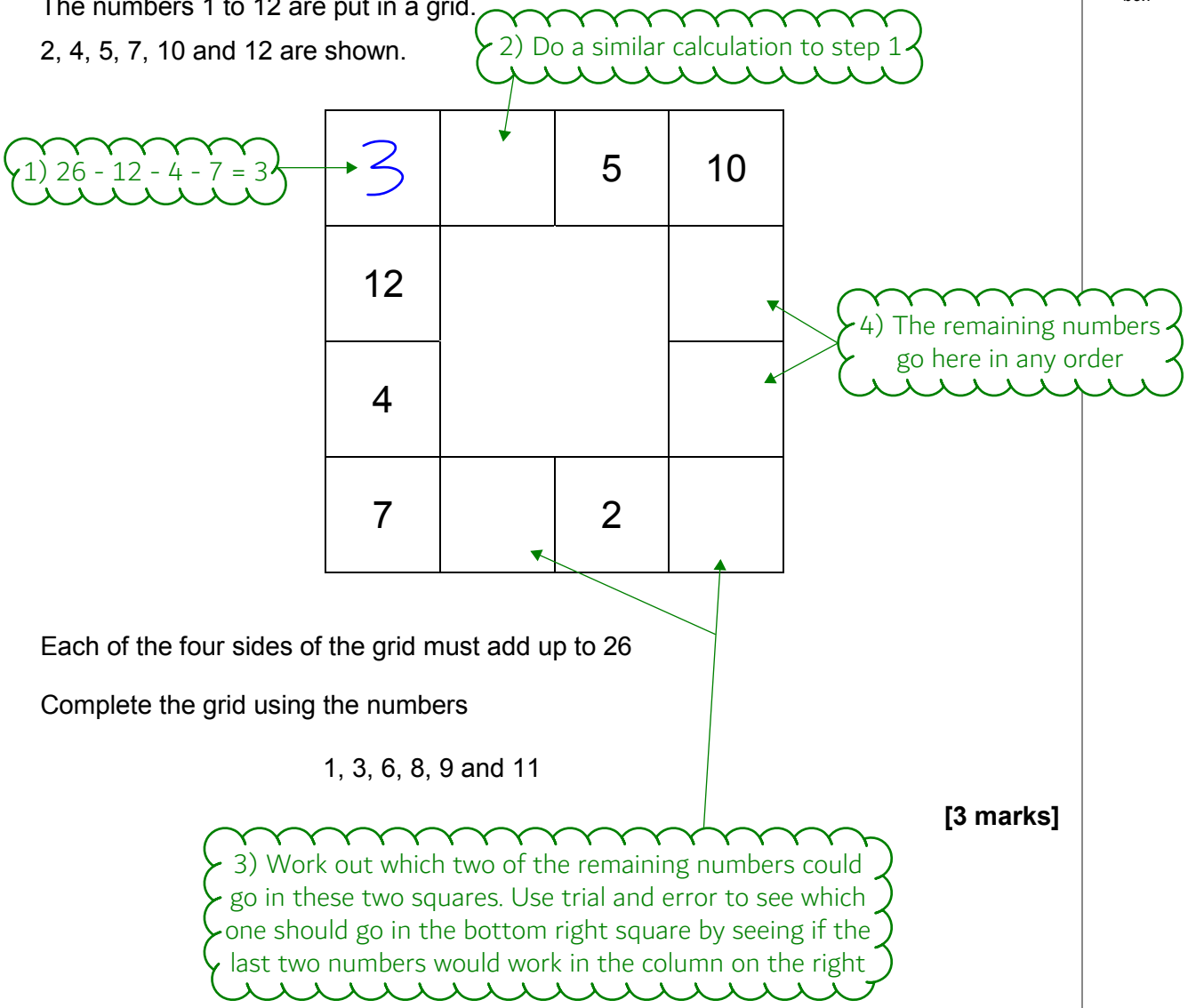
Turn over for the next question

8

Do not write outside the box

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

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



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]

Do not write outside the box

9 In this question, use

1 foot = 12 inches

1 inch = 2.5 centimetres

Change 5 feet 8 inches to centimetres.

[3 marks]

Convert the 5 feet into inches using the fact that every foot is 12 inches. Adding the 8 inches works out how many inches there are in total. Convert this into centimetres using the fact that every inch is 2.5 centimetres

Answer _____ cm

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

Circle your answer.

[1 mark]

~~4~~ 8 12 16

Factors of 4 are whole numbers which 4 can be divided by to get a whole number result. The factors of 4: 1, 4, 2. So there are only 3 factors of 4

Turn over for the next question

7

Do not write outside the box

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]

Enter table mode by pressing MENU then 3. f(x) = 3x. g(x) = 5x. Start: 11. End: 19. Step: 1

This lists out the possible codes. In the x column are the first numbers. In the f(x) column are the second numbers. In the g(x) column are the third numbers

Answer _____ _____ _____ _____ _____ _____

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

Circle your answer.

[1 mark]

315 325 515 525

There are 60 minutes in an hour

Do not write outside the box

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]

w is the subject so the formula tells us how to work out the number of cups of water needed. Substituting 7 for r in the right side finds w

Answer _____

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

[3 marks]

Make r the subject of the formula by following BIDMAS backwards and doing the opposite operations to both sides. Then substitute 20 for w

Answer _____

Turn over for the next question

9

Do not write outside the box

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]

Type it into the calculator exactly as it is above

Answer _____

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

Use approximations to decide.

You **must** show your working.

[3 marks]

Round each number to 1 significant figure and repeat the calculation. To do this, round the first figure using the second figure then set everything after the first figure to 0

Tick a box.

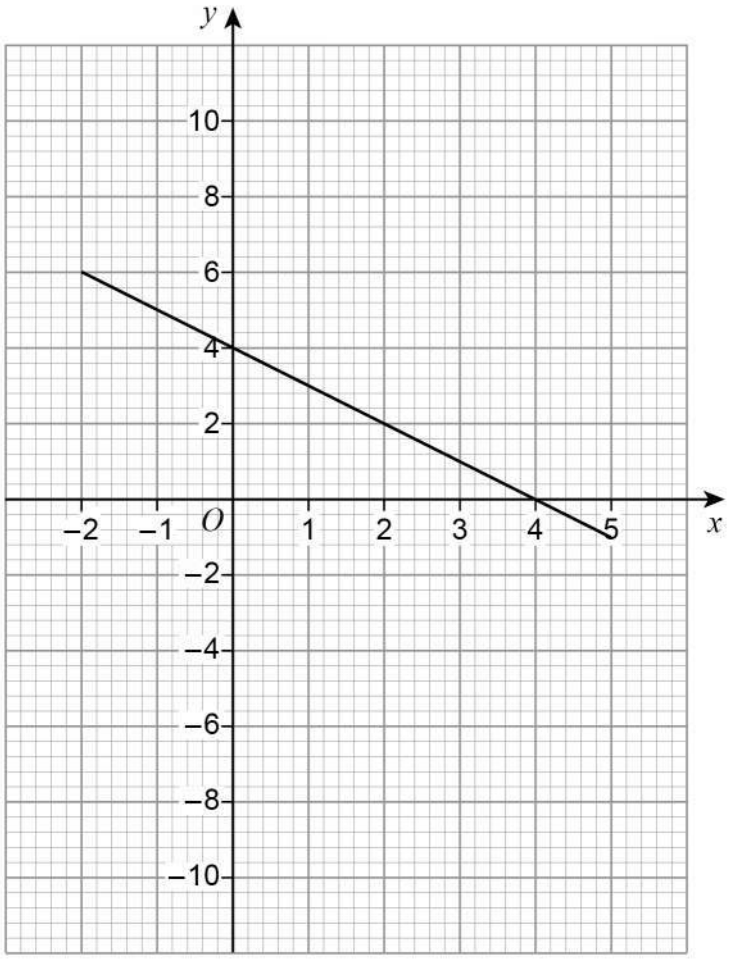
☐ Sensible ☐ Not sensible

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]

Work out the first and last point on the graph then join them up with a straight line. It must be a straight line as the equation is in the form y = mx + c. To work out the value of y when x is -2, substitute -2 for x in the equation



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

[1 mark]

$x =$ _____

It will be the x coordinate where both graphs cross each other

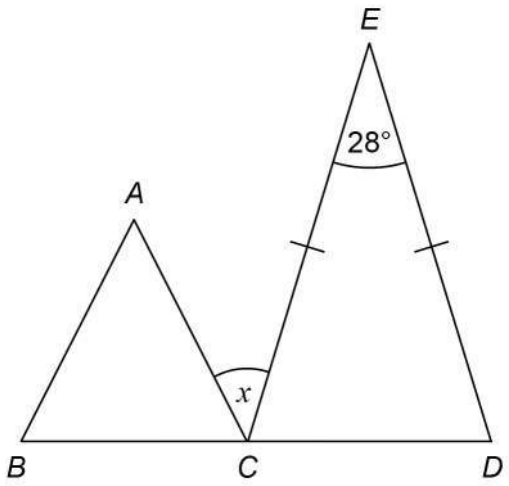
8

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

Triangle *ABC* is equilateral.

CE = *DE*

Not drawn accurately



Work out the size of angle x.

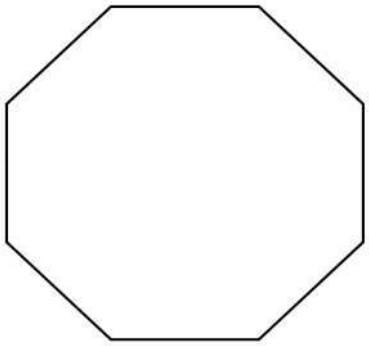
[4 marks]

There are 180° in total in a triangle. All the angles are equal in an equilateral. Isosceles triangles have two equal sides and its base angles are equal. Angles around a point on a straight line add up to 180°

Answer _____ degrees

Do not write outside the box

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]

She has done this calculation because she thinks there are 360° in total in an octagon. Dividing this by the 8 angles works out each interior angle

Turn over for the next question

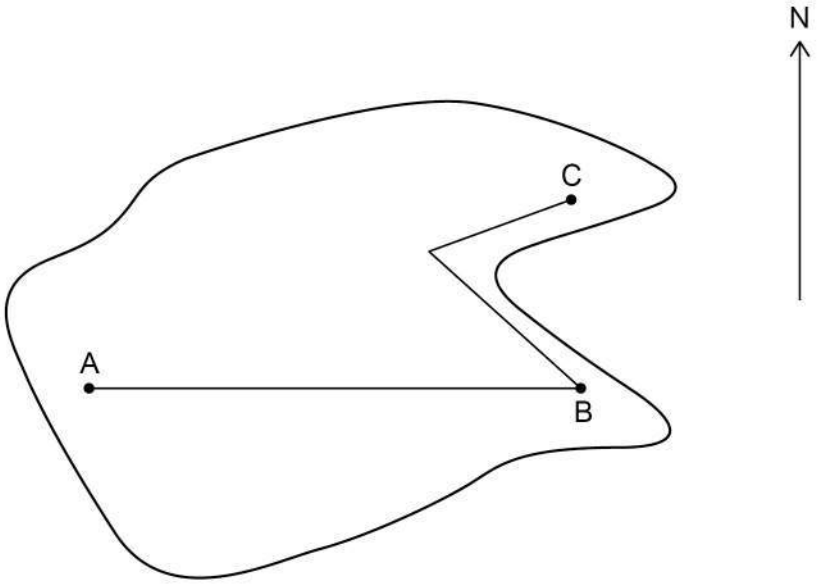
5

Do not write outside the box

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 _____ °

The bearing is the number of degrees needed to turn clockwise from north from B to face A

Do not write outside the box

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]

Measure both parts of the journey from B to C and add them together to work out the total distance in centimetres from B to C on the map. Subtracting this from the distance measured from A to B on the map works out how much further it is from A to B than B to C on the map. Multiplying this by 200 converts the distance on the map to the actual number of kilometres in real life

Answer _____ km

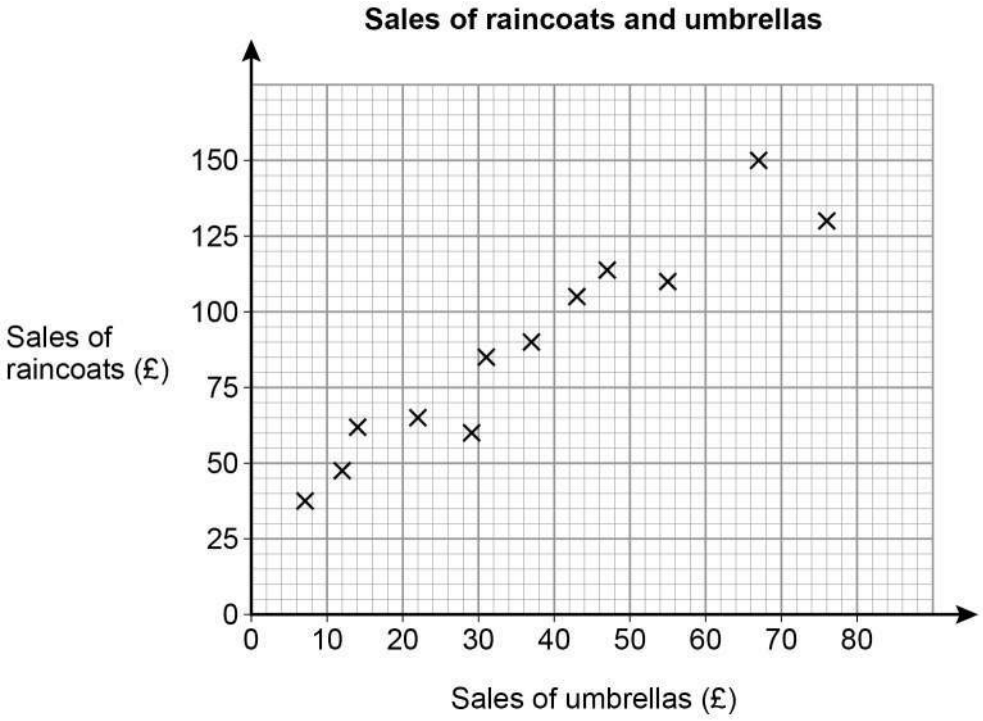
Turn over for the next question

6

Do not write outside the box

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: both variables increase together. Negative: as one variable increases the other decreases. None: there is no link between the two variables

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 £_____

Draw a line of best fit using a clear ruler by lining it up with the crosses so that there is an even spread above and below the line and so that the line goes in the same direction as the crosses. Then draw a line up from £60 on the x axis to the line then across to the y axis to make the estimate

Do not write outside the box

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

a could be 5 while b could be 2

6

Do not write outside the box

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]

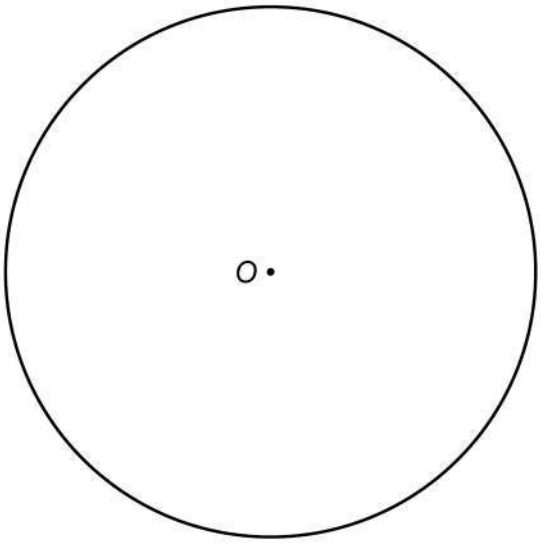
Circumference = π x diameter. Diameter = 2 x radius. To round to 1 decimal place, look at the number in the second decimal place to decide if it rounds the first decimal place up or down. If it is a 0, 1, 2, 3 or 4 it rounds down and if it is a 5, 6, 7, 8 or 9 it rounds up. Then set everything after the first decimal place to 0 and ignore them

Answer _____ cm

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

Draw a sector on the circle.

[1 mark]



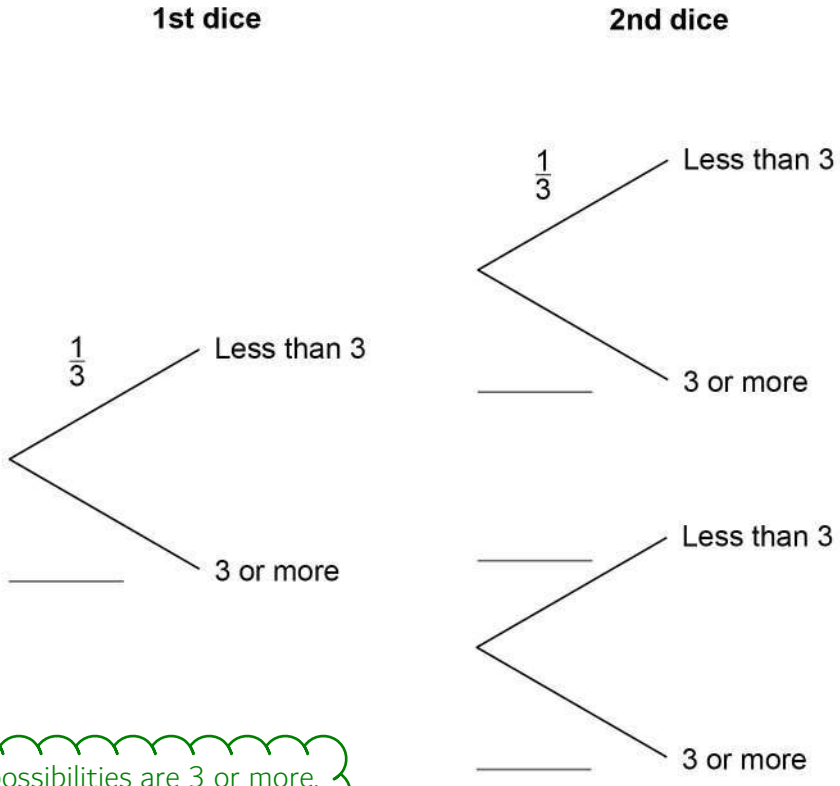
A sector is the area enclosed between two radii and the circumference

Do not write outside the box

22 Two ordinary fair dice are rolled.

22 (a) Complete the tree diagram.

[1 mark]



4 out of the 6 possibilities are 3 or more.
2 out of the 6 possibilities are less than 3

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

[1 mark]

Less than 3 AND less than 3. AND means to multiply the probabilities

Answer _____

Turn over for the next question

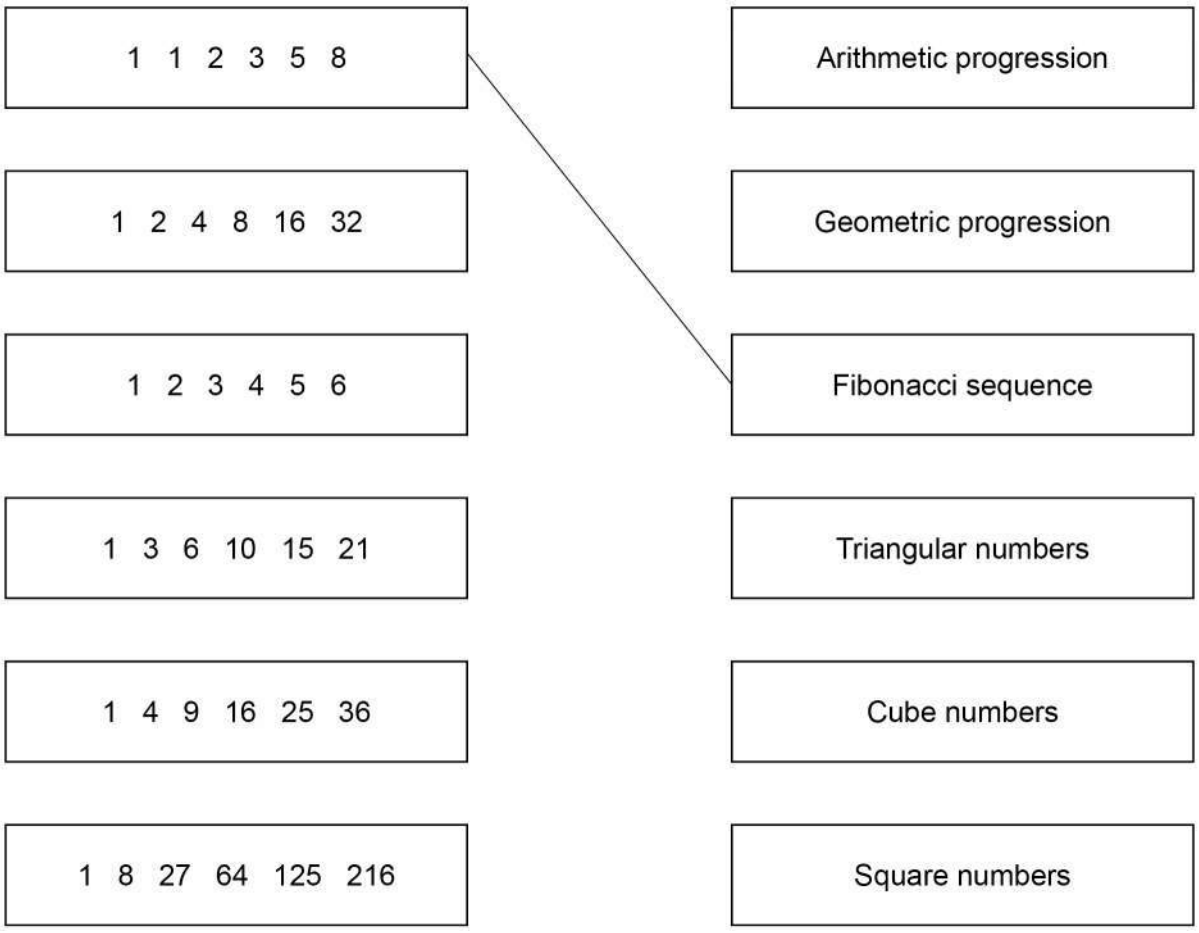
6

Do not write outside the box

23 Match each sequence to its description.

One has been done for you.

[4 marks]



Arithmetic progressions add the same amount between each term. Geometric progressions multiply by the same amount between each term. Triangular numbers start with 1, then add 2, then add 3, then add 4... Cube numbers are 1^3, 2^3, 3^3... Square numbers are 1^2, 2^2, 3^2...

Do not write outside the box

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]

Liam increased by 60000 for both 2001 to 2011 and 2011 to 2021. Work out the percentage increase for both of these to see if they are the same. Percentage change = (change/original) x 100

Answer _____

7

Do not write outside the box

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 _____

Express the number of hits as a fraction of the total number of throws for one of the days or for the total of all three days

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 It was based on more throws

Do not write outside the box

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]

Using table mode by pressing MENU then 3. f(x) = 18 + 4.50x. g(x) = 4x. Start: 1. End: 30. Step: 1

This lists out the amount of money each person has each week. The x column is the number of weeks. The f(x) column is the amount of money Theo has. The g(x) column is the amount of money James has. Scrolling down until the amount Theo has to the amount James has simplifies to 15 : 8. Ratios simplify by dividing both sides by the same amount to get smaller whole numbers

Answer _____

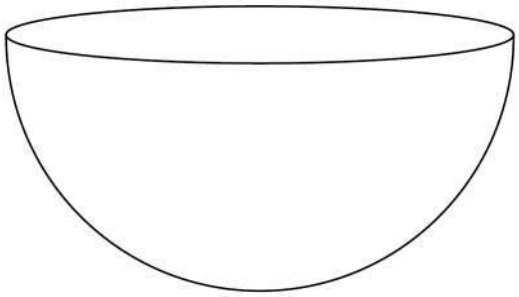
Turn over for the next question

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]

s d t ← This is basically a speed, distance, time problem. The speed is the rate the sand fills the container and the distance is the volume of the container

Answer _____

Do not write outside the box

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

Adding and subtracting half of the resolution works out the upper and lower bound. The resolution is the place value of the first decimal place

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

[1 mark]

Pentagons have 5 sides. The perimeter is found by multiplying the side length by 5

_____ cm ⩽ perimeter < _____ cm

END OF QUESTIONS

6