AQA

Please write clearly in block capitals.

Centre number ☐☐☐☐☐   Candidate number ☐☐☐☐

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
MATHEMATICS

F

Foundation Tier   Paper 1 Non-Calculator

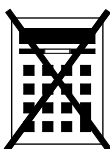Thursday 25 May 2017   Morning   Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
• mathematical instruments.

You must **not** use a calculator.

Instructions

• Use black ink or black ball-point pen. Draw diagrams in pencil.
• 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	
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

1 How many minutes are there in $3\frac{1}{2}$ hours?

Circle your answer.

[1 mark]

180.5   (210)   330   350

There are 60 minutes in an hour.
3 x 60 = 180
1/2 x 60 = 30
180 + 30 = 210

2 Work out $\frac{1}{4} + 0.5$

Circle your answer.

[1 mark]

0.30   0.6   (0.75)   0.9

Convert the fraction into a decimal as the answer needs to be a decimal.
1/4 = 0.25

$$0.25 \\ +0.50 \\ \overline{0.75}$$

3 Which of these shapes has the most sides?

Circle your answer.

[1 mark]

Hexagon   (Octagon)   Rhombus   Trapezium

6 sides   8 sides   4 sides   4 sides

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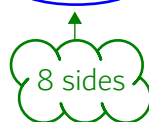
4 Solve $x - 3 = 0$

Circle your answer.

[1 mark]

$x = -3$ $x = 0$ $x = \dfrac{1}{3}$ $\boxed{x = 3}$

Rearranging the equation by adding 3 to both sides gives $x = 3$

5 Work out 58×73

[3 marks]

$$\begin{array}{r} 73 \\ \times\,58 \\ \hline 584 \\ 3650 \\ \hline 4234 \\ \hline \end{array}$$

Answer   4234

Check: 60 x 70 = 4200 so the answer seems reasonable.
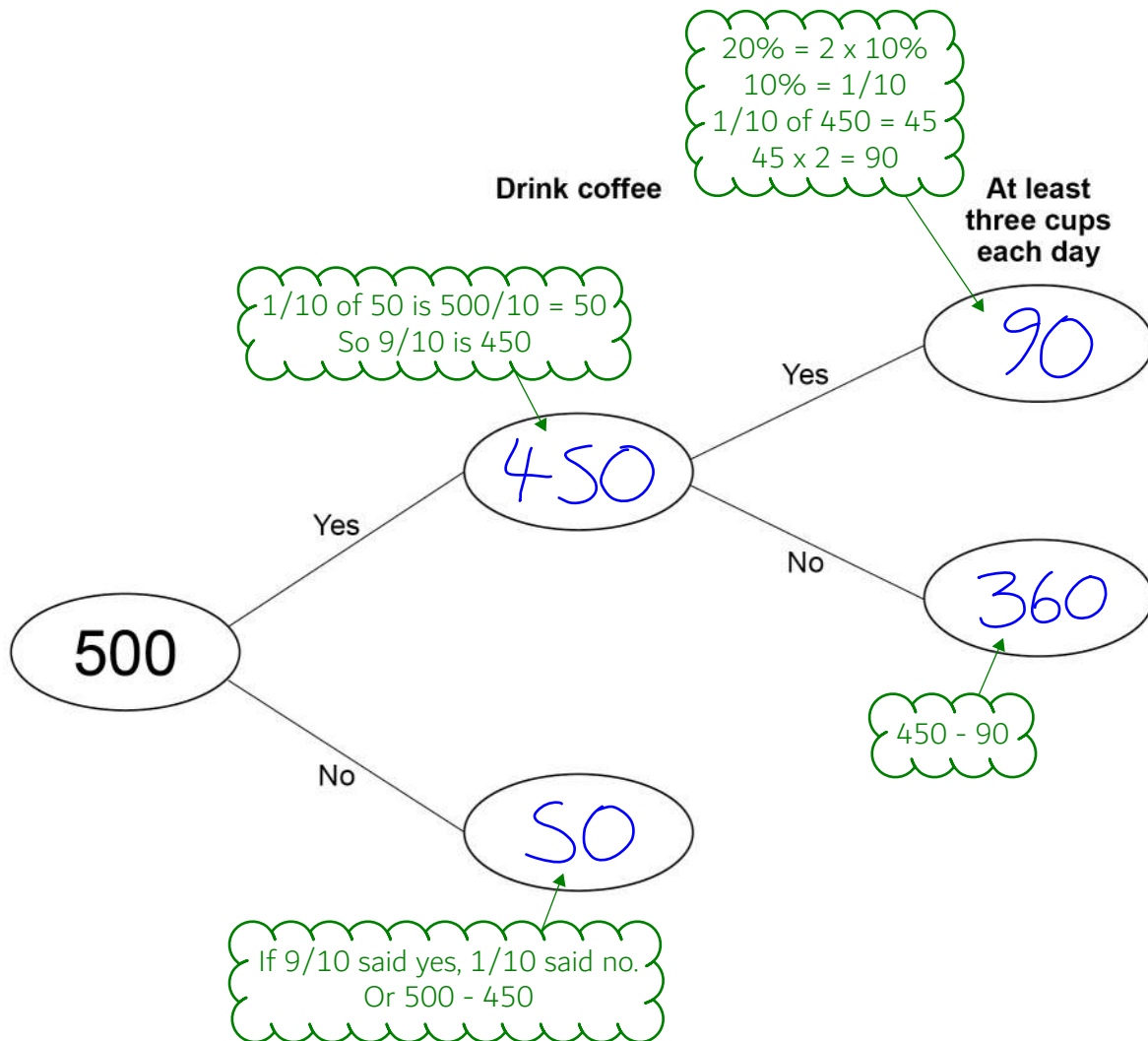
7

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0 3

6   500 people are asked if they drink coffee.

$\frac{9}{10}$ say Yes.

20% of the people who say Yes drink at least three cups each day.

6 (a)   Complete the frequency tree.

[4 marks]

20% = 2 x 10%
10% = 1/10
1/10 of 450 = 45
45 x 2 = 90

Drink coffee

At least three cups each day

1/10 of 50 is 500/10 = 50
So 9/10 is 450

90

Yes

450

No

360

450 - 90

Yes

500

No

50

If 9/10 said yes, 1/10 said no.
Or 500 - 450

6 (b) What fraction of the 500 people drink at least three cups of coffee each day?

Give your answer in its simplest form.

[2 marks]

$$\frac{90}{500} = \frac{9}{50}$$

90 out of 500

Answer $\dfrac{9}{50}$

7 By rounding each number to the nearest 10, estimate the answer to $\dfrac{61 \times 47}{102}$

Look at the units to determine if the tens round up or down. 0, 1, 2, 3 and 4 rounds down. 5, 6, 7, 8 and 9 rounds up.

You **must** show your working.

[2 marks]

$$\frac{60 \times 50}{100} = \frac{3000}{100}$$

*6 x 5 = 30
60 = 6 x 10
50 = 5 x 10
60 x 50 = 30 x 10 x 10*

Answer 30

Turn over for the next question

8

Turn over ▶

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8 Nadia has £5 to buy pencils and rulers.

Prices	
Pencils	8p each
Rulers	30p each

She says,

"I will buy 15 pencils.

Then I will buy as many rulers as possible.

With my change I will buy more pencils."

How many pencils and how many rulers does she buy?

[6 marks]

$$15 \times 8 = 120$$

Working out the cost of 15 pencils.

$$\begin{array}{r} 500 \\ -120 \\ \hline 380 \end{array}$$

Converted £5 into 500p then working out how much is left to spend on rulers.

$$30 \overline{)380} = 12 \text{ r } 20$$

Working out how many rulers can be bought with 380p. The remainder represents 20p left over.

$$\frac{20}{8} = 2 \text{ r } 4$$

Dividing the 20p remainder by the cost of a pencil works out how many can be bought. 4p remains.

Answer _____17_____ pencils, _____12_____ rulers

15 were originally bought. Then an additional 2 were bought.

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9 Work out $25.68 \div 12$

[2 marks]

$$12\overline{)25.68} \quad \overset{2.14}{}$$

Answer _____ 2.14 _____

10 Work out $\dfrac{3}{8} \times 11$

Give your answer as a mixed number.

[2 marks]

$\dfrac{33}{8}$ ← (3 x 11 = 33)

(33/8 = 4 r1)

$4\dfrac{1}{8}$

Answer _____ $4\dfrac{1}{8}$ _____
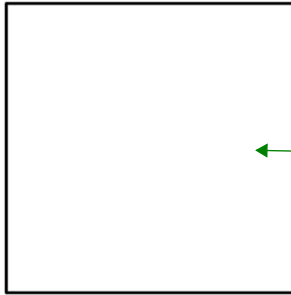
10

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11 A triangle has perimeter 32 cm
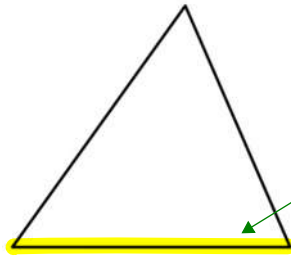
This side is 10 cm as it is a side of the square. This means both of the other sides can be found by 32 - 10 = 22
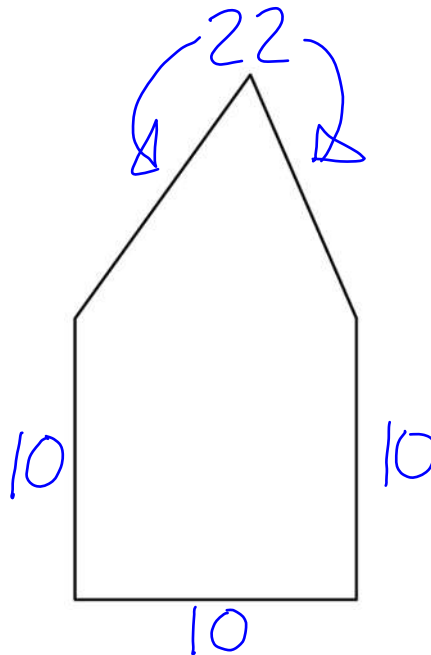
Not drawn accurately

A square has perimeter 40 cm

All sides of a square are equal. 40/4 = 10

Two sides of the shapes are put together to make a pentagon.

Not drawn accurately

22

10   10

10

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Work out the perimeter of the pentagon.

[4 marks]

$22 + 10 + 10 + 10$

Adding up all the sides works out the perimeter.

Answer _____52_____ cm

Turn over for the next question

Turn over ▶

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09

4

12 A football team has P points.

$$P = 3W + D$$

W is the number of wins

D is the number of draws

12 (a) A team has 6 wins and 2 draws.

How many points does the team have?

[1 mark]

$3 \times 6 + 2$

W = 6, D = 2 Substitute these values into the formula to find P.

Answer _____ 20

12 (b) After 33 games a different team has 53 points.

11 games were draws.

The formula essentially means there are 3 points for a win and 1 point for a draw, so there must be 0 points for a loss.

How many games has this team **lost**?

[4 marks]

$53 - 11 = 42$

11 draws scores 11 points. Subtracting this from 53 works out how many points were for wins.

$3 \overline{)42}$ 14

This works out how many games were won.

$33 - 11 - 14$

The remainder of the games must have been lost.

Answer _____ 8

13

$$2 + 0 + 1 + 7 = 10$$

Make the following calculations correct.

Use only the symbols $+, -, \times, \div$ and $(\ )$

[3 marks]

$$2 \; + \; 0 \; + \; 1 \; - \; 7 \; = \; -4$$

$$2 \; \times \; 0 \; \times \; 1 \; \times \; 7 \; = \; 0$$

$$(2 \; + \; 0) \; \times \; (1 \; + \; 7) \; = \; 2^4$$

Turn over for the next question

Turn over ▶

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IB/M/Jun17/8300/1F

14 A number is picked at random from the first four **prime** numbers.

A number is picked at random from the first four **square** numbers.

The two numbers are added to get a score.

14 (a) Complete the table.

[4 marks]

Square numbers

+	**1**	**4**	**9**	16
2	3	6	11	18
3	4	7	12	19
5	6	9	14	21
7	8	11	16	23

Prime numbers

14 (b) What is the probability that the score is a **prime** number?

[1 mark]

The prime numbers are 3, 11, 7, 19, 11 and 23. There are 16 possibilities in total.

Answer $\dfrac{6}{16}$

No need to simplify however 3/8 is correct as well.

15 In a school show,

girls : boys = 1 : 1

girls who sing : girls who do not sing = 1 : 2

8 girls **sing** in the show.

How many students are in the show altogether?

[3 marks]

$8 \times 2 = 16$

$16 + 8 = 24$

24×2

Using the second ratio, twice as many girls don't sing so 16 don't sing. There are 24 girls in total. Using the first ratio, there are as many boys as girls so we can double the number of girls to give the total.

Answer   48

Turn over for the next question

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16   *P* and *Q* are points on the line $3x + 2y = 6$

16 (a)   Complete the coordinates of *P* and *Q*.

[2 marks]

$2y = 6$

$3x = 6$

x = 0 at point *P*. 3 x 0 = 0 so this leaves $2y = 6$
y = 0 at point *Q*. 2 x 0 = 0 so this leaves $3x = 6$

P (0 , **3**)   *Q* (**2** , 0)

16 (b)   Draw the line $3x + 2y = 6$ for values of *x* from –3 to 3

[2 marks]

Both point *P* and *Q* lie on the line so plot these coordinates. It is a linear equation (no powers of *x* or *y*) so it is a straight line going through these points.
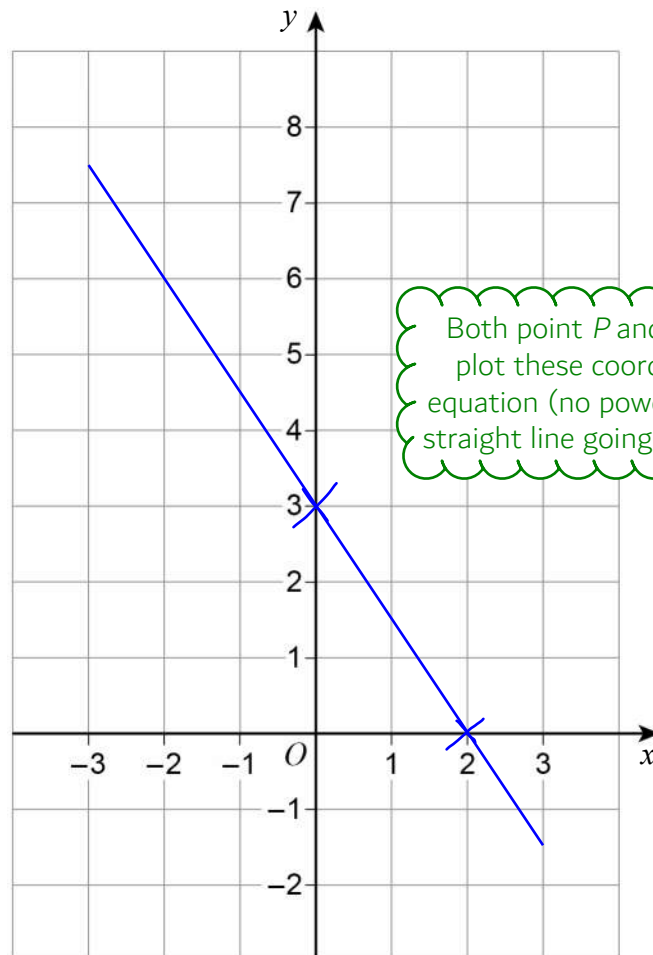
17 Circle the expression which does **not** simplify to y^3

This simplifies to y^4

[1 mark]

$y \times y \times y$ $\qquad$ $y^4 \div y$ $\qquad$ $y^2 \times y$ $\qquad$ $\boxed{y^6 \div y^2}$

18 Write the number six million five thousand two hundred in standard form.

[2 marks]

6005200

Its easier to start writing 200, then 5000 first.

Divided by 10 6 times to get an appropriate decimal so it needs multiplying by 10^6 to keep the value the same.

Answer $\qquad 6.0052 \times 10^6$

https://youtu.be/PM-CgGIVTxE

Turn over for the next question

7

Turn over ▶

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19 (a) Use 8 km/h = 5 mph to convert 96 km/h to mph

[2 marks]

$$\frac{96}{8} = 12$$

Working out how many lots of 8 km/h there are. There are this many lots of 5 mph as they are equal.

$$12 \times 5$$

Answer _____ **60** _____ mph

19 (b) *x* km/h = *y* mph

Use 8 km/h = 5 mph to write a formula for *y* in terms of *x*.

[2 marks]

Describe the process we made in the previous part algebraically. x, the number of km/h, is divided by 8 then multiplied by 5. This finds y, the number of mph.
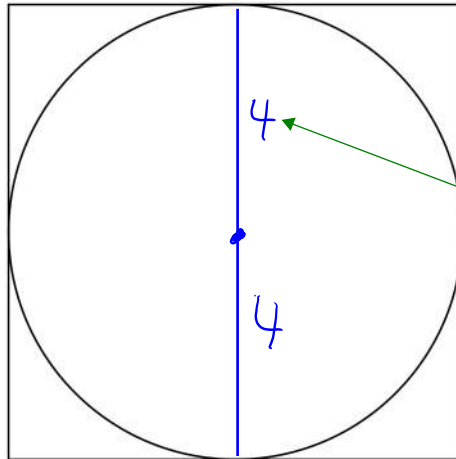
Answer $y = \frac{x}{8} \times 5$

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20 Here is a circle touching a square.

$\sqrt{64} = 8$

The length of the sides on the square

8

Not drawn accurately

4

The radius is half of the length of the square

$\frac{8}{2} = 4$

4

The area of the square is 64 cm^2

Work out the area of the circle.

Give your answer in terms of π.

[3 marks]

πr^2

$\pi \times 4^2$

Answer _____ 16π _____ cm^2

https://youtu.be/GGVClNMZ698

Turn over for the next question

7

Turn over ▶

.CG Maths.

21 Billy wants to buy these tickets for a show.

4 adult tickets at £15 each

2 child tickets at £10 each

A 10% booking fee is added to the ticket price.

3% is then added for paying by credit card.

Work out the **total** charge for these tickets when paying by credit card.

[5 marks]

$4 \times 15 + 2 \times 10 = 60 + 20 = 80$

$80 \div 10 = 8$

$80 + 8 = 88$

$(88 \div 100) \times 3 = 0.88 \times 3 = 2.64$

$88 + 2.64$

$$
\begin{array}{r}
0.88 \\
\times \quad 3 \\
\hline
2.64 \\
\end{array}
$$

Answer £ __90.64__

https://youtu.be/ibGT8CkJFHI

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22 (a) Density = $\dfrac{\text{mass} \times 6}{\text{volume} \times 3}$ = $\dfrac{m}{V} \times \dfrac{6}{3}$ $\dfrac{6}{3} = 2$

The mass of solid A is 6 times the mass of solid B.

The volume of solid A is 3 times the volume of solid B.

Complete the sentence.

[1 mark]

The density of solid A is _____2_____ times the density of solid B.

22 (b) Average speed = $\dfrac{\text{distance} \div 2}{\text{time} \quad \times 2}$ Dividing by twice the amount is basically dividing by 2   ÷2 then ÷2

If the distance is halved and the time is doubled, what happens to the average speed?

Circle your answer.

[1 mark]

× 2   × 4   no change   ÷ 2   (÷ 4)

https://youtu.be/7YGLTVslGGw

Turn over for the next question

7

Turn over ▶

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23 A regular polygon has an exterior angle of 20°

Work out the number of sides of the polygon.

[2 marks]

$$\frac{360}{20} = \frac{36}{2}$$

Exterior angle = 360/number of sides
Number of sides = 360/exterior angle

Answer _____ 18 _____

24 $\dfrac{1}{2} : \dfrac{2}{3} = x : 1$

Circle the value of x.

The ratio has been simplified so that the right hand side is 1. 2/3 needs to be divided by 2/3 to get 1. Dividing by 2/3 needs to happen on both sides of the ratio. Dividing 1/2 by 2/3 is the same as 1/2 x 3/2 = (1 x 3)/(2 x 2)

[1 mark]

$\dfrac{1}{3}$ $\dfrac{3}{5}$ $\boxed{\dfrac{3}{4}}$ $\dfrac{4}{3}$

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25 The table shows information about the times for 10 people to complete a task.

Time, t (minutes)	Frequency
$0 < t \leqslant 20$	1
$20 < t \leqslant 40$	6
$40 < t \leqslant 60$	3

These statements are about the mean and range of the actual times.

Tick the correct box for each statement.

[4 marks]

True **False**

Lowest possible results: 0, 20, 20, 20, 20, 20, 20, 40, 40, 40
The mean of six 20s is 20. Three 40s weigh up the mean more than one 0 weighs it down.

The mean could be less than 20 minutes ☐ ☒

Highest possible results: 20, 40, 40, 40, 40, 40, 40, 60, 60, 60
The mean of six 40s is 40. Three 60s weigh up the mean more than one 20 weighs it down.

The mean could be more than 40 minutes ☒ ☐

Lowest possible results: 0, 20, 20, 20, 20, 20, 20, 40, 40, 40
The mean of three 40s is 40. Six 20s and one 0 all weigh the mean down.

The mean could be less than 40 minutes ☒ ☐

Highest: 60, Lowest: 0
60 - 0 = 60
The range could be up (but not equal to) 60

The range could be more than 40 minutes ☒ ☐

Highest: 40, Lowest: 20
40 - 20 = 20

The range could be less than 40 minutes ☒ ☐

The range could be up (but not equal to) 60
The range could be more than 60 minutes ☐ ☒
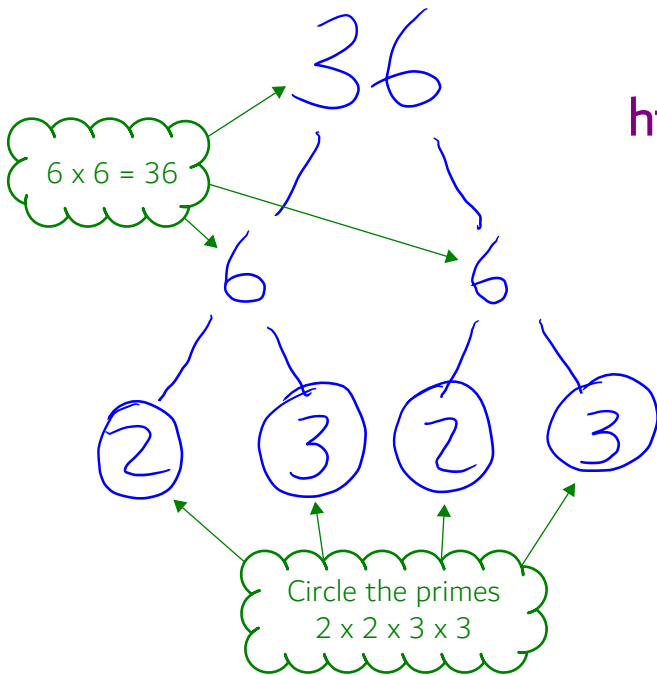
https://youtu.be/PC-i_ntDKSM

7

Turn over ▶

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26 Write 36 as a product of prime factors.

Give your answer in index form.

[3 marks]

36

6 x 6 = 36

6   6

2   3   2   3

Circle the primes
2 x 2 x 3 x 3

https://youtu.be/bzXHjrgoTvY

Answer $2^2 \times 3^2$

Check:
$2^2 \times 3^2 = 4 \times 9 = 36$

27 Circle the value of cos 90°

[1 mark]

0          $\frac{1}{2}$ $\frac{\sqrt{3}}{2}$ 1
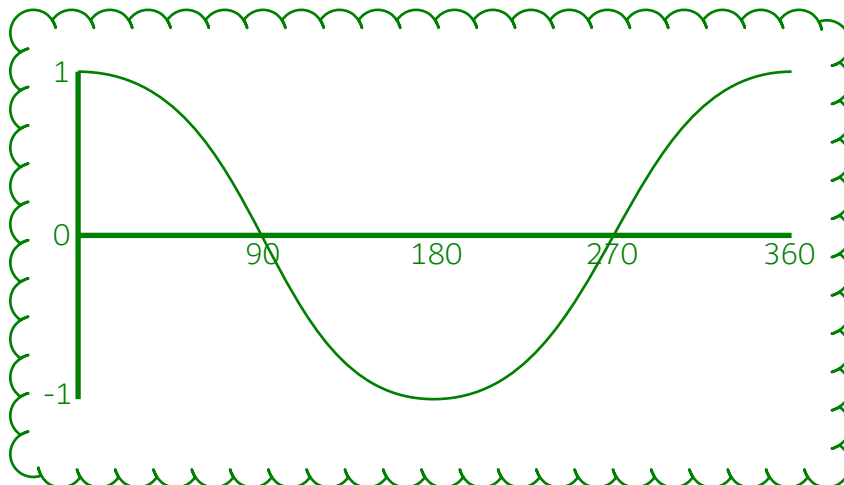
28   Solve the simultaneous equations.

$2x + y = 18$ —— ①

$x - y = 6$ —— ②

[3 marks]

(annotation: 2x+x, y+-y=0)

(annotation: 18+6)

① + ② $3x = 24$

$x = 8$

(annotation: 24/3)

(annotation: 2x, 2×8)

$16 + y = 18$

$y = 2$

(annotation: 16 + 2 = 18)

Answer $x = 8$, $y = 2$

END OF QUESTIONS

7

2 3