AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

F

Foundation Tier Paper 3 Calculator

Tuesday 11 June 2019 Morning Time allowed: 1 hour 30 minutes

A

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	
26	
TOTAL	

Do not write outside the box

Answer **all** questions in the spaces provided

1 Circle the value of the digit 2 in the answer to 5200 ÷ 10

[1 mark]

2 | 20 | 200 | 2000

2 Solve $x - 8 = 5$

Circle your answer.

[1 mark]

$x = -13$ | $x = -3$ | $x = 3$ | $x = 13$

3 Circle the fraction that is equal to $2\frac{1}{4}$

[1 mark]

$\frac{7}{4}$ | $\frac{9}{4}$ | $\frac{21}{4}$ | $\frac{25}{4}$

Do not write outside the box

4 Circle the expression which means x divided by y

[1 mark]

$\frac{x}{y}$ ✓ $\frac{y}{x}$ $\frac{1}{xy}$ $\frac{1}{x+y}$

5 Put these numbers in order from smallest to largest.

$\frac{31}{40}$ $\frac{3}{4}$ $\frac{7}{10}$ 0.725

[2 marks]

0·750 0·700

31/40 = 62+15+0·5 / 100 = 77·5/100 = 0·775 ✓

×2·5 ×2·5

Smallest	0·700	7/10
	0·725	0·725
	0·750	3/4
Largest	0·775	31/40

✓ All in correct order

6

Do not write outside the box

6 Josh downloads album A.

A has 11 tracks.

Each track on A costs the same.

The total cost of downloading A is £8.80

Josh also downloads album B.

B has 14 tracks.

6 (a) Work out the total cost of downloading B.

Assume each track costs the same as a track on A.

[3 marks]

£8·80 ✓ = 80p per track
11 Tracks

80p x 14 Tracks = £11·20 ✓
✓

Answer £ 11·20

Do not write outside the box

6 (b) In fact, compared to the cost of each track on A

the cost of 6 tracks on B is **more** by 5p each

the cost of 8 tracks on B is **less** by 5p each.

What does this tell you about your answer to part (a)?

Tick **one** box.

- [✓] The total cost is **less** than my answer to part (a)
- [ ] The total cost is **more** than my answer to part (a)
- [ ] The total cost is **the same** as my answer to part (a)

Give a reason for your decision.

[2 marks]

more tracks (8-6) are of the lower price than the higher, +6 -6 cancel leaving 2 tracks at 5p less ✓

Turn over for the next question

5

Do not write outside the box

7 The pictogram shows information about the houses in a street.

Each house has 3, 4 or 5 bedrooms.

Key: 🏠 represents 2 houses

3-bedroom houses	🏠 🏠 🏠 🏠 🏠 = 1
4-bedroom houses	🏠 🏠 🏠 🏠 🏠
5-bedroom houses	🏠 🏠 = 1

2+2+2+2 +1 = 9

2+2+2+2+2 =10

2+1 =3

In total, how many bedrooms do these houses have?

[3 marks]

9 houses have 3 bedrooms so 9x3 =27

+

10 houses have 4 bedrooms so 10x4= 40

+

3 houses have 5 bedrooms so 3x5= 15

27+40+15 = 82

Answer 82 bedrooms

Do not write outside the box

8 Four positive whole numbers add up to 84

One of the numbers is a multiple of 17

The other three numbers are equal.

What are the four numbers?

[3 marks]

$x + x + x + 17n = 84$

So $3x + 17n = 84$

Looking at the 17x table

17, 34, 51, 68, ~~85 ....~~ too big

Answer 11 11 11 51

Which difference between 84 and 17n is divisible by 3?

84 − 68 = 16 ✗ not in 3x table

84 − 51 = 33 ✓ yes! 3 × 11

Turn over for the next question

6

Do not write outside the box

9 Jim wants to buy 10 rolls of wallpaper.

He sees these prices.

Wallpaper	
Single roll	£12.50
Pack of 3 rolls	£34.50
Pack of 5 rolls	£58.75

10 rolls = £125 ✓

What is the cheapest price for 10 rolls?

[4 marks]

or 3 rolls x 4 packs (3 not enough as only 9 rolls)

=> 4 packs x £34.50 = £138 ✓

or 5 rolls x 2 packs

=> 2 packs x £58.75 = £117.50 ✓

Cheapest is Pack of 5 rolls

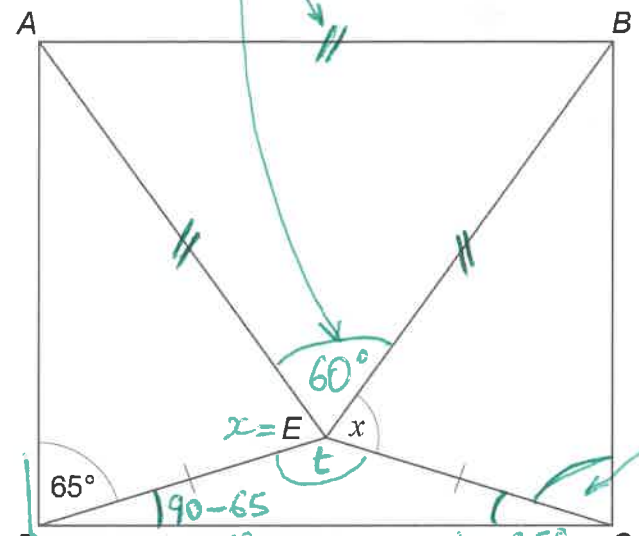
Answer £ 117.50 ✓

Do not write outside the box

10 In rectangle *ABCD*

triangle *ABE* is equilateral

triangle *CDE* is isosceles, with *CE* = *DE*



Not drawn accurately

Work out the size of angle x.

[4 marks]

angle $E = x$

angle $t = 360° - 60 - x - x$

$t = 180° - 25 - 25$

so $360 - 60 - x - x = 180 - 25 - 25$

$300 - 2x = 130$

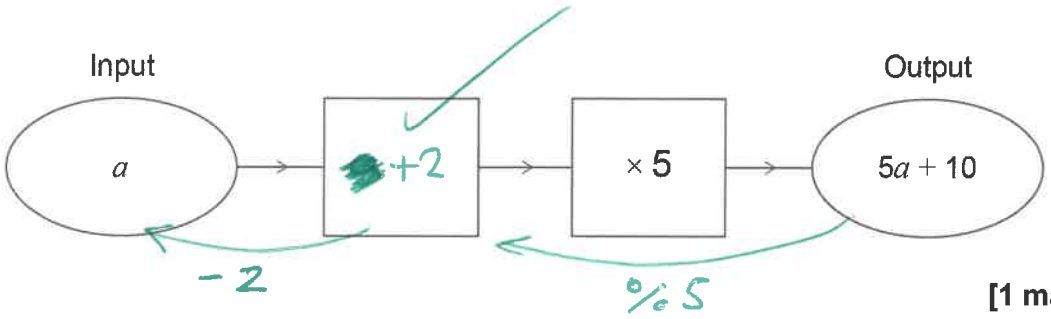
$170 = 2x$

Answer $x = \frac{170}{2} = 85°$ degrees

8

Do not write outside the box

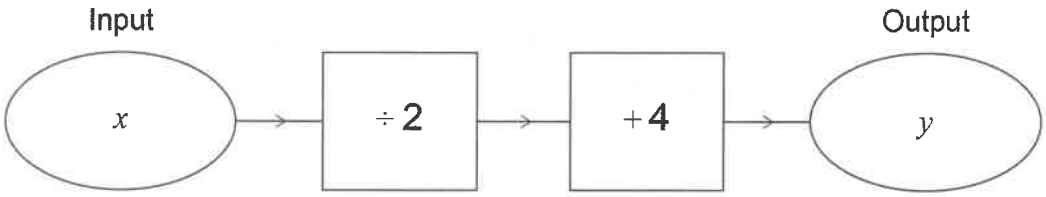
11 (a) Complete the number machine.



[1 mark]

5a+10 $\frac{5a+10}{5}$ = a+2 then a+2 −2 = a

11 (b) Write down the output y in terms of x. ie y = what?



[1 mark]

x then $\frac{x}{2}$ then $\frac{x}{2}+4$

Answer $y = \frac{x}{2} + 4$ ✓

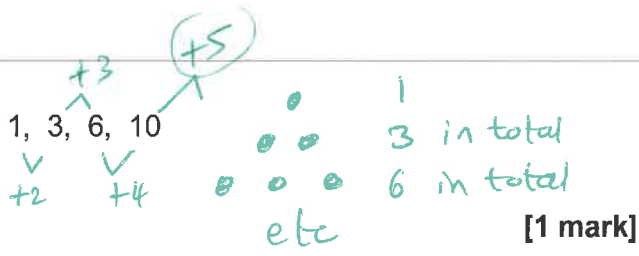
so

Do not write outside the box

12 The first four triangular numbers are 1, 3, 6, 10

Circle the next triangular number.

[1 mark]



14 15 16 19

13 Write down **all** the prime numbers between 40 and 50

[2 marks]

41, 43, 47, 49

42 44 45 46 48

is not a 7×7=49!

Answer 41 43 47

all correct

-1 for any single error

Turn over for the next question

5

Do not write outside the box

14 In this question use

1 cubic foot = 6.23 gallons

1 cubic foot = 0.028 cubic metres

Ratios!

Convert 3115 gallons into cubic metres.

[3 marks]

Both the same so $6.23\,gal = 0.028\,m^3$

gal	m^3
6.23	0.028
3115	?

so $\frac{3115\,gal}{6.23\,gal} = 500$

now $500 \times 0.028\,m^3$

Answer = 14 m^3

Do not write outside the box

15 Circle the correct statement.

[1 mark]

$\frac{1}{3} \leqslant 30\%$ $\frac{1}{3} = 30\%$ $\frac{1}{3} < 30\%$ $\frac{1}{3} \neq 30\%$

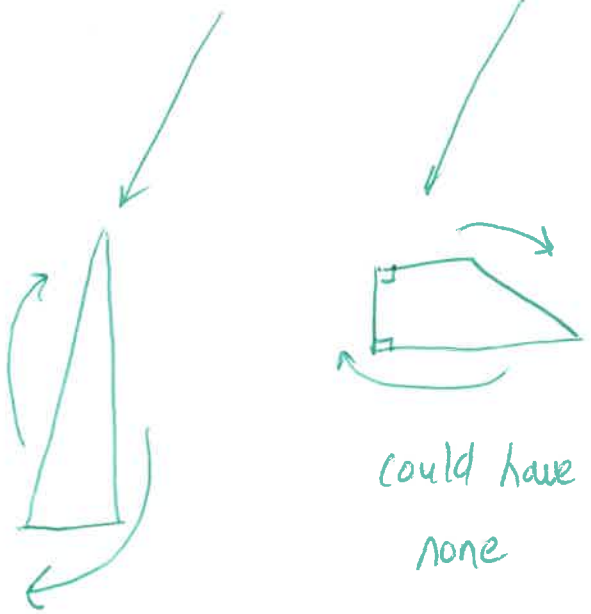
$1/3 = 33.333\ldots\%$ so more than 30%

16 Which shape **must** have rotational symmetry?

Circle your answer.

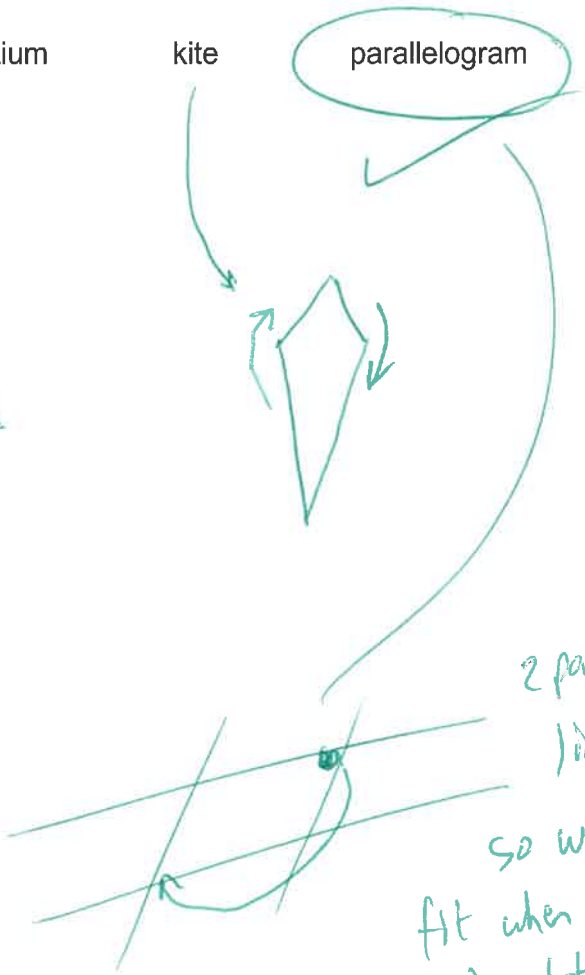
[1 mark]

isosceles triangle trapezium kite parallelogram



could have none

could have none



2 parallel lines so will fit when 180° rotated always

Turn over for the next question

5

Do not write outside the box

17 A shop sells ice creams.

Each ice cream has two scoops.

The possible flavours are vanilla (V), strawberry (S), chocolate (C) and mint (M).

The two scoops can be the same flavour or different flavours.

17 (a) List **all** the possible options for the two scoops.

[2 marks]

VV SS CC MM
VS SC CM
VC SM
VM

notice that VS and ~~SV~~ not included etc as this is the same icecream!

Do not write outside the box

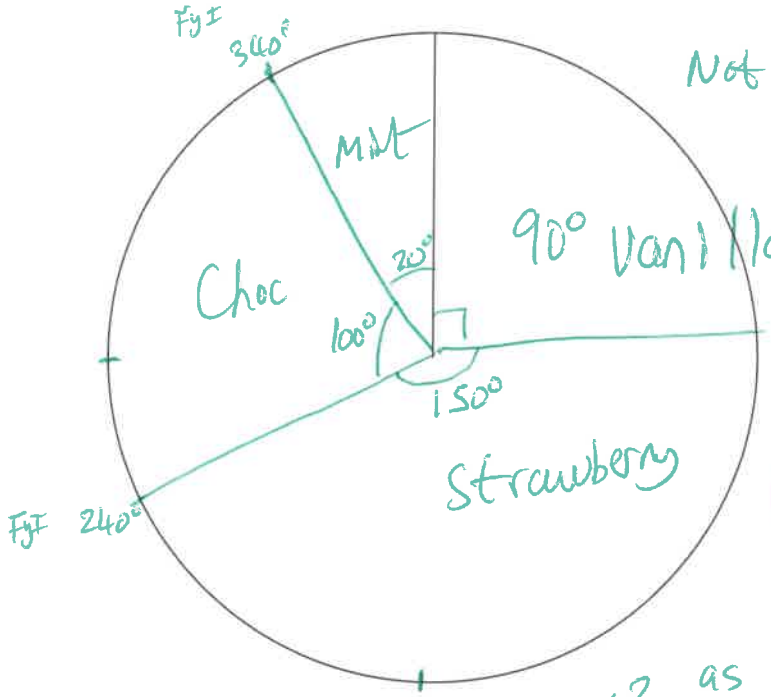
17 (b) In one hour the shop sells 180 scoops of ice cream.

The number of scoops of each flavour is shown in the table.

Flavour	Vanilla	Strawberry	Chocolate	Mint
Number of scoops	45	75	50	10

Complete the pie chart to represent the data.

[4 marks]



Not drawn accurately!

notice

180 x 2 = 360!

Create the table

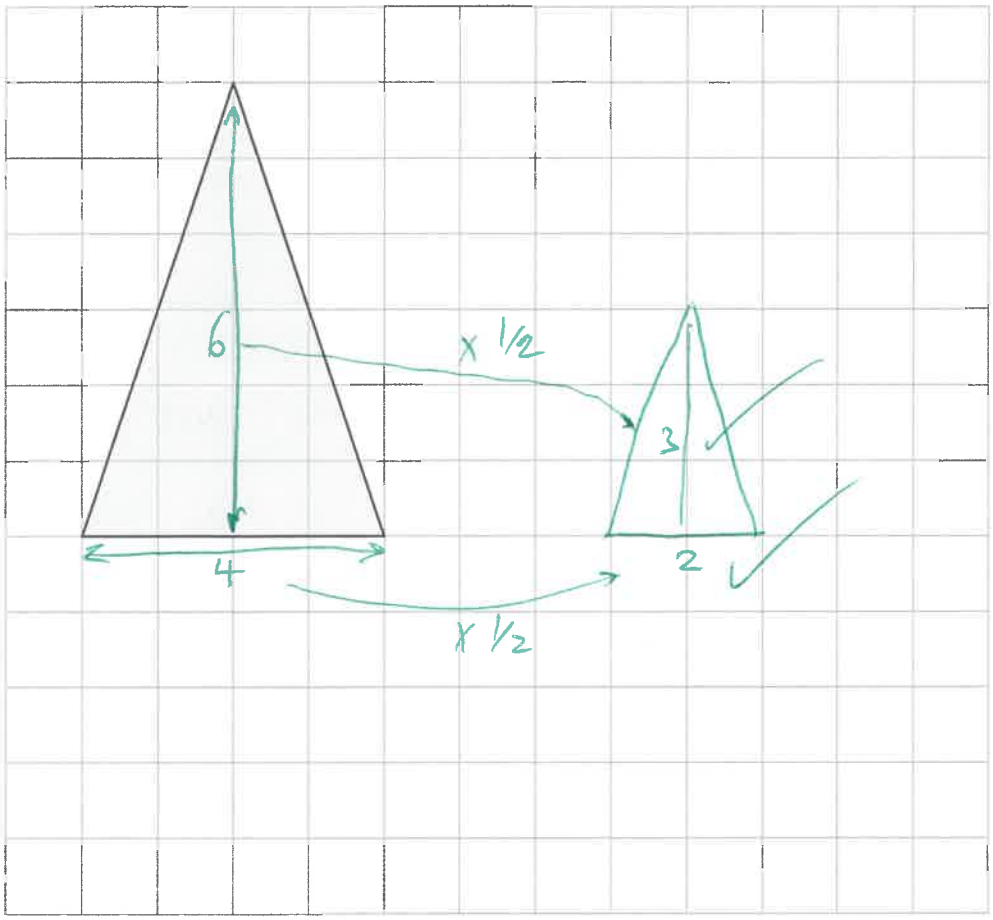
x2 as 2 x 180° = 360°

	Actual Values	Fractions	x2	Angle	
Van	45	45/180		90/360°	90°
St	75	75/180	x2	150/360°	150°
Choc	50	50/180	x2	100/360°	100°
Mt	+ 10	10/180	x2	20/360°	20°
Total	180	1		360°/360°	✓

✓ ✓

6

18 On the grid, draw an enlargement of the triangle with scale factor $\frac{1}{2}$ half the size **[2 marks]**



3 x 2 triangle in any position or orientation

Do not write outside the box

19 (a) Simplify fully $3a^2 + 7a + 3 - a^2 + 8a - 4$

[3 marks]

$3a^2 - a^2 + 7a + 8a + 3 - 4$

Answer $2a^2 + 15a - 1$ ✓ ✓ ✓

19 (b) Factorise fully $24y^2 - 20y$

[2 marks]

put everything the same in both on the outside

$2 \times 2 \times 2 \times 3 \times y \times y \quad -2 \times 2 \times 5 \times y$

$2 \times 2 \times y (2 \times 3 \times y - 5)$ ✓

$4y(6y - 5)$

Answer $4y(6y - 5)$ ✓

20 Solve $x^2 = 196$

[2 marks]

$x = \sqrt{196}$ ✓ use calculator

Answer 14 ✓

9

Do not write outside the box

21 To the nearest pound, Jon has £9

To the nearest 50p, Ellie has £6.50

Work out the maximum possible total amount of money.

[3 marks]

halfway is £9.50
so max is £9.49 ✓

halfway is £6.75
so max is £6.74 ✓

Total max is 9.49 + 6.74

Answer £ 16.23 ✓

This question is not about upper bands and is a rounding question

Do not write outside the box

22 Here is a formula.

$$T = n^2 - \frac{12}{n}$$

$T = 5^2 - \frac{12}{5}$

22 (a) Work out T when $n = 5$

[1 mark]

$T = 25 - 2.4$

Answer $= 22.6$ ✓

22 (b) Why is T **always** positive when n is negative?

[2 marks]

when n is neg then n^2 is pos+

as $- \times - = +$

Reasoning ✓

also $\frac{-12}{n}$ when n is neg is $\frac{-12}{-\square}$

and $- \div - = +$

the T = pos+ + pos+ ✓ adding 2 positives

6

Turn over ▶

Do not write outside the box

23 In one hour a machine can make

600 nuts = per hour 600 nuts/1hr

or

720 bolts. = per hour 720 bolts/1hr

At 3 pm the machine starts working.

It makes 900 nuts and then changes to making bolts.

How many **bolts** will the machine make by 8 pm?

[4 marks]

Nuts

900 = 600 + 300

= 1hr + ½ hr ✓

Nuts start 3pm + 1hr + ½hr = 4:30pm stop ✓

Bolts 4:30pm start → + 3hr 30mins → 8:00pm stop ✓

Now 3hr + ½hr × 720 bolts per hr

= 3.5 × 720

Answer = 2520 bolts ✓

Do not write outside the box

24 Two solids, J and K, have the same density.

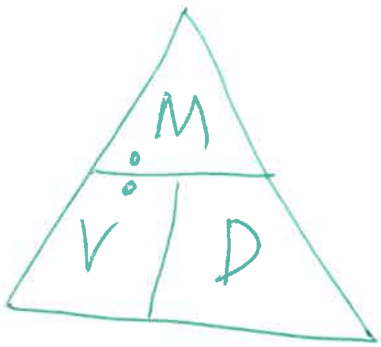
Complete the table.

Include units in your answers.

[3 marks]

	J	K
Mass	48 g	78 g
Volume	8 cm^3	13 cm^3
Density	6 g/cm^3	6 g/cm^3

Same



$\frac{\text{mass}}{\text{volume}} = \text{density}$

So $\frac{48\text{g}}{8\text{cm}^3} = 6\text{g/cm}^3$

Now $\frac{\text{mass}}{\text{density}} = \text{volume}$ so $\frac{78\text{g}}{6\text{g/cm}^3} = 13\text{cm}^3$

Turn over for the next question

7

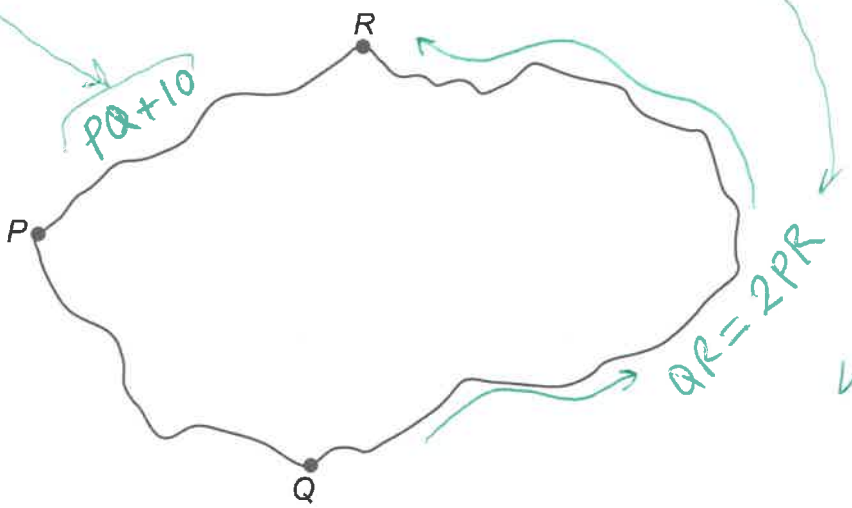
Do not write outside the box

25 Towns *P*, *Q* and *R* are connected by roads *PQ*, *PR* and *QR*.

PR is 10 km longer than *PQ*.

QR is twice as long as *PR*.

The total length of the three roads is 170 km



Not drawn accurately

Work out the length of *PQ*.

[4 marks]

$PR + QR + PQ = 170\ km$

$(PQ+10) + (2PR) + PQ = 170$

$(PQ+10) + (2(PQ+10)) + PQ = 170$

$PQ + 10 + 2PQ + 20 + PQ = 170$

$4PQ + 30 = 170$

$4PQ = 140$

$PQ = 140/4 = 35\ km$

Answer 35 km

Do not write outside the box

26 Mia wants to borrow £6000 and repay it, with interest, after two years.

She sees two offers for loans.

Offer 1	**Offer 2**
Compound interest	Compound interest
3% per year	First year 1%
	Second year 5%

Mia says,

"I will pay back the same amount because the average of 1% and 5% is 3%"

Is she correct?

You **must** show your working.

[3 marks]

offer 1 $6000 \times 1.03^2 = £6365.40$

offer 2 $6000 \times 1.01 \times 1.05 = £6363$

No she is not correct as these two figures are different

Turn over for the next question

7

Do not write outside the box

27 Here are two sets of numbers, A and B.

Set A		Set B		
200	160	270	400	483
104	100	300	x	

mean of Set A : mean of Set B = 3 : 8

Work out the value of x.

[4 marks]

Set A mean (average) ⇒ $\frac{200+160+104+100}{4}$

$= 141$ ✓

Ratio 3 : 8 means $\frac{141}{3} \times 8$ to find other mean

= mean of 376 ✓

Answer 427 ✓

Set B mean ⇒ $\frac{270+400+483+300+x}{5}$

but this is 376

So $376 = \frac{270+400+483+300+x}{5}$ ✓

$5 \times 376 = 1453 + x$, $1880 - 1453 = x$

$427 = x$

Do not write outside the box

28 A straight line

has gradient 4

and

passes through the point (5, 23)

Work out the equation of the line.

Give your answer in the form $y = mx + c$

[3 marks]

as gradient is 4 then $m = 4$

So $y = 4x + c$

Now put in $y = 23$ and $x = 5$

$23 = 4(5) + c$

$23 = 20 + c$ So $c = 3$

Answer $y = 4x + 3$

Turn over for the next question

7

Do not write outside the box

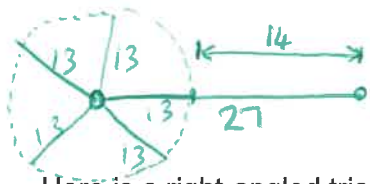
29 Two sides of a triangle have lengths 13 cm and 27 cm

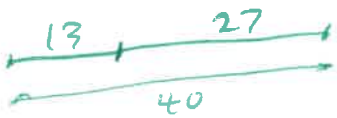
Which of these is a **possible** length of the other side?
Circle your answer.

[1 mark]

13 cm 14 cm 27 cm 40 cm

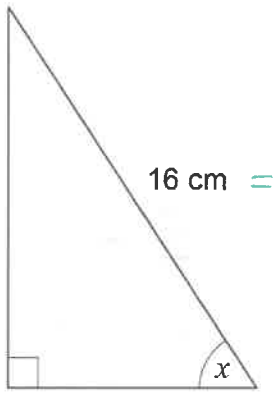
Think





30 Here is a right-angled triangle.

Not drawn accurately



opp = 13 cm hyp = 16 cm

$\sin = \frac{opp}{hyp}$

Use trigonometry to work out the size of angle x.

[2 marks]

$\sin^{-1} x = \frac{13}{16}$

use inv sin buttons = 54.3409...

Answer 54° degrees

END OF QUESTIONS

3