OCR
Oxford Cambridge and RSA

F

GCSE (9–1) Mathematics

J560/01 Paper 1 (Foundation Tier)

Thursday 24 May 2018 – Morning

Time allowed: 1 hour 30 minutes

You may use:
- a scientific or graphical calculator
- geometrical instruments
- tracing paper

First name									
Last name									
Centre number						Candidate number				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **16** pages.

Answer **all** the questions.

1 Here is a list of numbers.

2 8 5 12 6

(a) From this list, write down

(i) the odd number,

(a)(i) 5 **[1]**

(ii) the cube number.

$2^3 = 2 \times 2 \times 2 = 8$

(ii) 8 **[1]**

(b) Using the same list of numbers, work out

(i) the median,

2 5 6 8 12

(b)(i) 6 **[1]**

(ii) the range.

$12 - 2 = 10$

(ii) 10 **[2]**

2 Here are the first four terms of a sequence.

2 ×2 4 ×2 8 ×2 16

(a) What is the next term in the sequence?

16×2

(a) 32 **[1]**

(b) Explain how you worked out your answer.

Multiply by 2 **[1]**

3 **(a)** Write 48 as a percentage of 200.

$\frac{48}{200} \overset{\div 2}{=} \frac{24}{100}$

(a) 24 % **[1]**

(b) Work out $\frac{1}{4}$ of 80.

$80 \div 4 = 20$

(b) 20 **[1]**

(c) Decrease 650 by 40%.

$100\% - 40\% = 60\%$

$60\% \div 100 = 0.6$

$0.6 \times 650 = 390$

(c) 390 **[3]**

4 Patrick writes down a number.

↳ x

He says

> If I find the square root of that number and then add 15, I get 27.

What number did Patrick write down?

$\sqrt{x} + 15 = 27$

$-15 \quad -15$

$\sqrt{x} = 12$

$2 \quad 2$

$x = 12^2$

$= 144$

144 **[2]**

5 **(a)** Write 12 : 54 as a ratio in its simplest form.

÷6 ÷6

(a) ..... 2 ..... : ..... 9 ..... **[2]**

(b) The ratio 400 g : 1 kg can be written in the form 1 : *n*.

Find the value of *n*.

1kg = 1000g

400 : 1000

÷400 ÷400

1 : 2.5

(b) *n* = ... 2.5 ..... **[2]**

(c) Amanda and Wim share some money in the ratio 2 : 5.
Wim receives £115.

Calculate how much money was shared.

A : W

2 : 5

x 23 x 23

£46 : £115

Total = 46 + 115

(c) £ ..... 161 ..... **[3]**

6 A leopard is running with a velocity of 3 m/s. (u)
It then accelerates at 2 m/s^2 for 4 seconds. (a) (t)

Use the formula

$v = u + at$

to work out the final velocity of the leopard.

(v)

V = 3 + 2 x 4

= 11

..... 11 ..... m/s **[2]**

7 **(a)** Solve.

(i) $4x = 56$

$\div 4 \quad \div 4$

$x = 14$

(a)(i) $x =$ 14 **[1]**

(ii) $\frac{126}{x} = 7$

$\times x \quad \times x$

$126 = 7x$

$\div 7 \quad \div 7$

$18 = x$

(ii) $x =$ 18 **[1]**

(iii) $8x - 6 = 46$

$+6 \quad +6$

$8x = 52$

$\div 8 \quad \div 8$

$x = \frac{52}{8} = 6.5$

(iii) $x =$ 6.5 **[2]**

(b) Solve by factorising.

$x^2 + 11x + 30 = 0$

$5 \times 6 = 30$

$5 + 6 = 11$

$(x + 5)(x + 6) = 0$

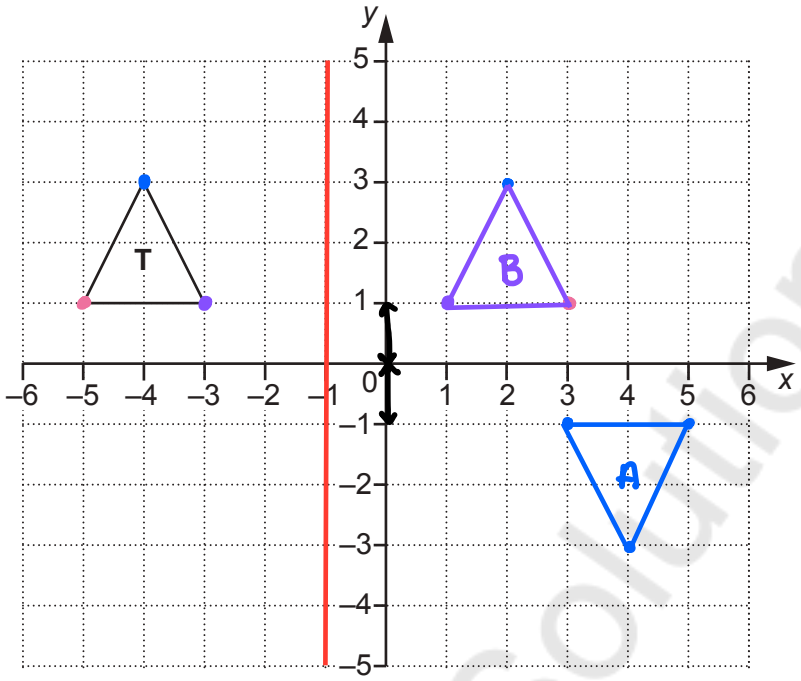
$x + 5 = 0 \qquad x + 6 = 0$

$-5 \quad -5 \qquad -6 \quad -6$

$x = -5 \qquad x = -6$

(b) $x =$ −5 or $x =$ −6 **[3]**

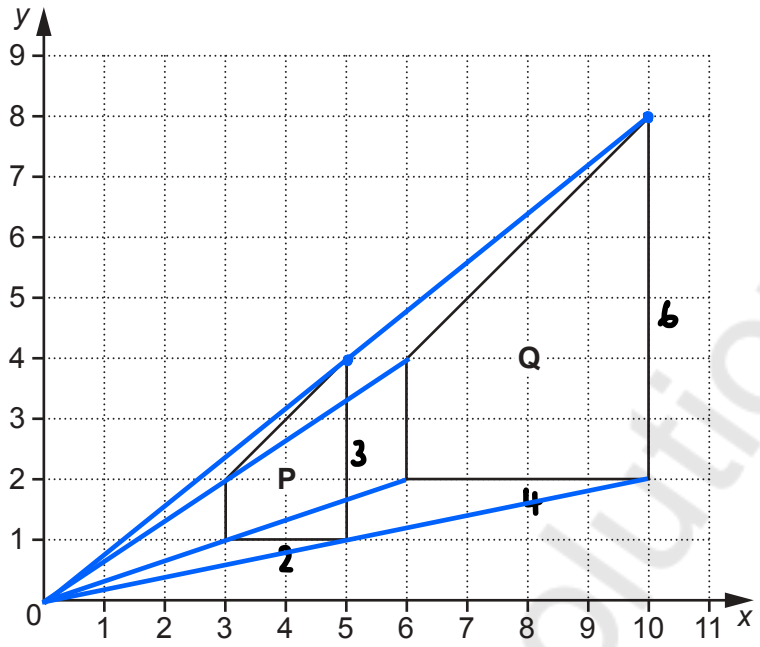
8 Triangle **T** is drawn on a coordinate grid.



(a) Rotate triangle **T** through 180° about (0, 0).
Label your image **A**. **[2]**

(b) Reflect triangle **T** in the line $x = -1$.
Label your image **B**. **[2]**

9 Two shapes are drawn on the grid below.



Describe fully the **single** transformation which maps shape **P** onto shape **Q**.

Enlargement by scale factor 2, centre (0, 0)

..... [3]

10 Reuben hires a car.
It costs £150, **plus** 85p for each mile he travels.

When Reuben hires the car, its mileage is 27 612 miles.
When Reuben returns the car, its mileage is 28 361 miles.

How much did Reuben pay to hire the car?

Miles driven = 28361 − 27612
= 749

85p = £0.85

0.85 × 749 = 636.65

£150 + £636.65 = £786.65

£ 786.65 ..... [4]

11 Pippa owns a snack bar.

(a) She uses $\frac{3}{5}$ of a kilogram of spread each day.

Spread costs £3.20 for a 1 kilogram tub and £6.15 for a 2 kilogram tub.

Pippa buys enough spread to last for 14 days.

What is the lowest price Pippa can buy this spread for?
Show your working.

$14 \times \frac{3}{5} = 8.4 \text{ kg}$

$\approx 9 \text{ kg}$

4 2 kg tubs + 1 1kg tub

$4(6.15) + 3.20$

$= 27.8$

(a) £ 27.80 **[4]**

(b) In 2016, Pippa paid £1650 rent.
In 2017, the rent increased by 14%.

Calculate the amount of rent she paid in 2017.

$100\% + 14\% = 114\%$

$114\% \xrightarrow{\div 100} 1.14$

$1.14 \times 1650 = 1881$

(b) £ 1881 **[3]**

12 A circle has radius 6 cm.

Calculate its circumference.
Give your answer in centimetres, correct to 1 decimal place.

$C = 2\pi r \quad r = 6$

$= 2 \times \pi \times 6$

$= 12\pi$

$= 37.699111184$

$= 37.7$

37.7 cm **[3]**

13 **(a)** Show that the highest common factor (HCF) of 18 and 63 is 9. **[2]**

18	
1	18
2	9
3	6

63	
1	63
3	21
7	9

(b) Find the lowest common multiple (LCM) of 18 and 63.

18 36 54 72 90 108 126

63 126

..... 126 ..... **[2]**

14 Aditi, Becky and Calli collect coins.
Aditi has 6 **more** coins than Becky.
Calli has 1 **less** coin than Aditi.
Altogether they have 71 coins.

How many coins do they each have?
Show all your working.

Becky = x

Aditi = $x + 6$

Calli = $x + 6 - 1$
= $x + 5$

$x + x + 6 + x + 5 = 71$

$3x + 11 = 71$
$-11 \quad -11$
$3x = 60$
$\div 3 \quad \div 3$
$x = 20$

Aditi has ..... 26 ..... coins

Becky has ..... 20 ..... coins

Calli has ..... 25 ..... coins
[5]

15 Lee wishes to find out if there is a relationship between a person's age and the time it takes them to complete a puzzle.

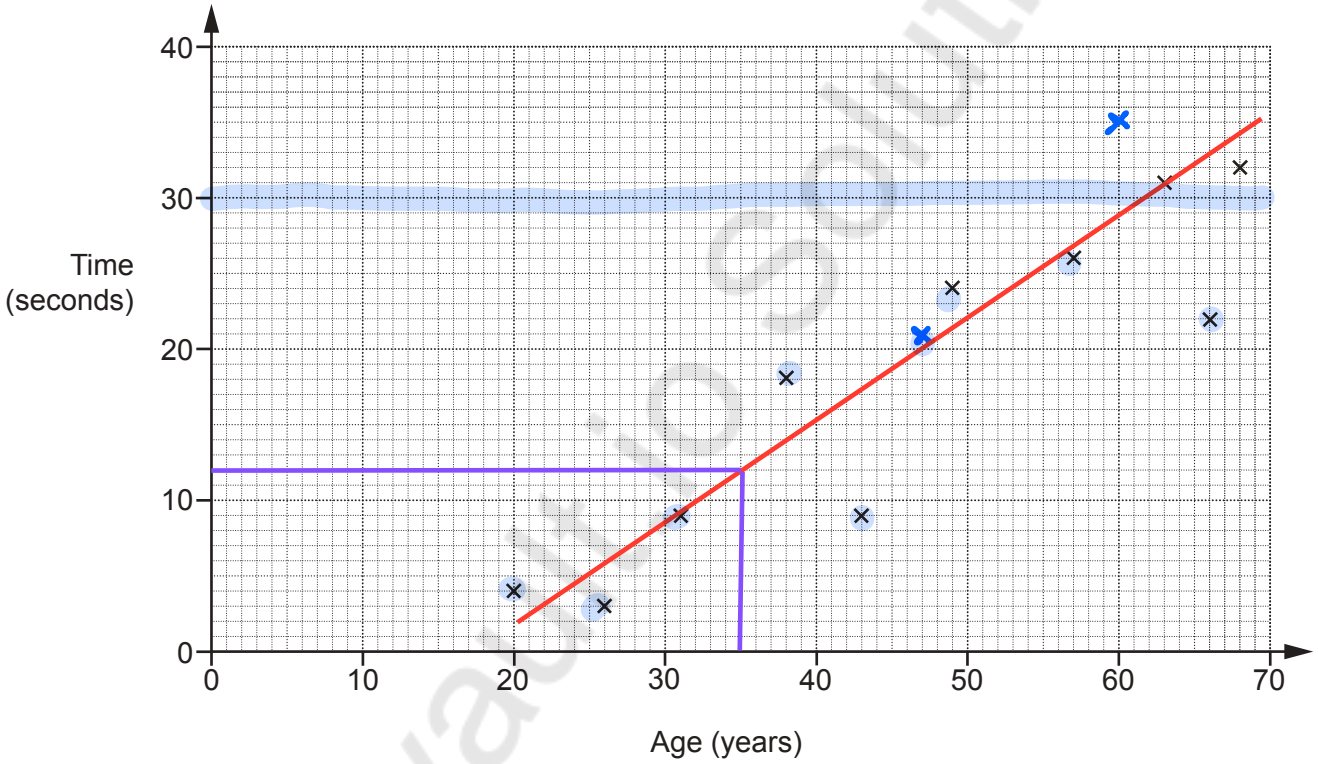
Lee decides to conduct an experiment.
She asks 12 people to complete the puzzle.
She records each person's age and the time taken to complete the puzzle.

(a) Make one criticism of Lee's method.

Sample size is small.

[1]

This scatter diagram shows the results for ten of the people in Lee's experiment.



(b) Here are the other two results.

Age (years)	47	60
Time (seconds)	21	34

Plot these results on the scatter diagram. **[2]**

(c) What type of correlation is shown in the scatter diagram?

(c) Positive **[1]**

(d) Estimate the time it would take a person aged 35 to complete the puzzle.
Show your working to justify your answer.

(d) ..... 12 seconds ..... **[2]**

(e) Lee says that at least 80% of the 12 people completed the puzzle in under 30 seconds.

Is Lee correct?
Show working to support your answer.

$\frac{9}{12} \times 100 = 75\%$.

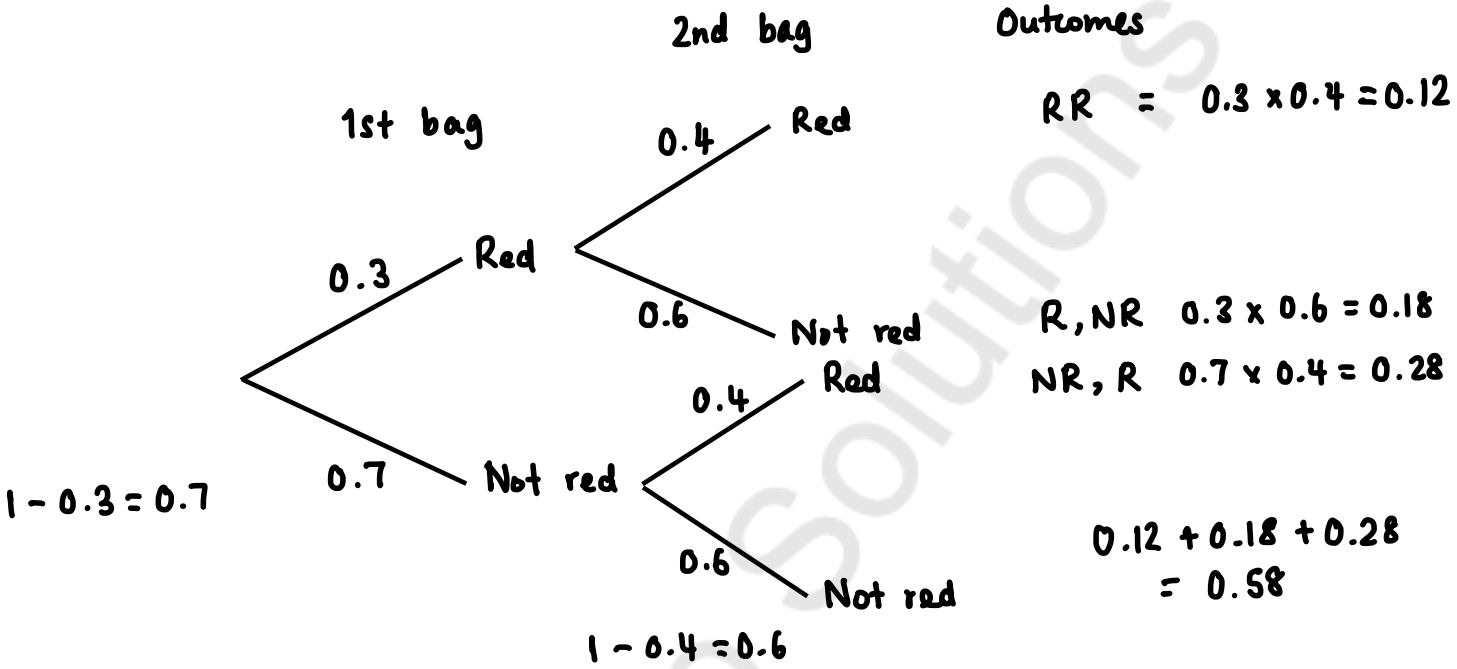
Lee is wrong as $75\% < 80\%$.

..... **[3]**

16 Finn has two bags of counters.
He takes a counter at random from each bag.

The probability that he takes a red counter from the first bag is 0.3.
The probability that he takes a red counter from the second bag is 0.4.

What is the probability that he takes **at least** one red counter?



Outcomes

RR = 0.3 x 0.4 = 0.12

R, NR 0.3 x 0.6 = 0.18

NR, R 0.7 x 0.4 = 0.28

0.12 + 0.18 + 0.28
= 0.58

0.58 ..... **[4]**

17 The price of a computer was £750.

In a sale the price is reduced by 20%.
On the final day the **sale price** is reduced by a further 12%.

How much is saved in total by buying the computer on the final day of the sale?

Sale

100% - 20% = 80%

80% $\xrightarrow{\div 100}$ 0.8

0.8 x £750 = £600

Final Day

100% - 12% = 88%

88% $\xrightarrow{\div 100}$ 0.88

0.88 x £600 = £528

Saved

£750 - £528 = £222

£ 222 ..... **[5]**

18 The table below shows the weight, $w$kg, of the bags that people took on a plane.

Weight of bag (kg)	Frequency	midpoint	midpoint × freq.
$0 < w \leqslant 10$	16	5	80
$10 < w \leqslant 15$	10	12.5	125
$15 < w \leqslant 20$	20	17.5	350
$20 < w \leqslant 25$	8	22.5	180
$25 < w \leqslant 30$	6	27.5	165
Total	60		900

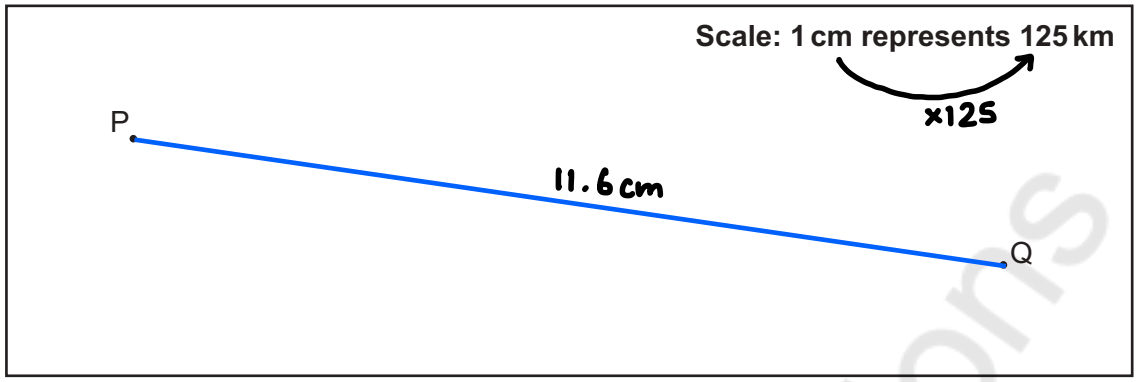
Calculate an estimate of the mean weight of the 60 bags.

Mean = 900 ÷ 60

= 15

15 ..... kg **[4]**

19 The scale diagram below shows two cities, P and Q.



A plane departs from P at 0947 and arrives at Q at 1207.

(a) Work out the average speed, in kilometres per hour, of the plane.

Distance P to Q = 11.6 × 125
= 1450 km

Time 09 47 + 13 mins → 10 00 + 2h 7 mins → 12 07

2h 20 mins
÷60 = 0.3̇h

60 mins = 1h
÷60

2h + 0.3̇h = 2.3̇h

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{1450\text{ km}}{2.3\dot{}\text{h}}$$

$$= 621.\dot{4}28571\dot{}$$

$$\approx 621.4$$

(a) 621.4 km/h **[5]**

(b) Give one reason why your answer may be inaccurate.

The plane may not have flown in a straight line. **[1]**

20 The scale diagram below shows towns, A, B and C.
Line AB represents the road from A to B and line AC represents the road from A to C.

A shopping centre is to be built so that it is

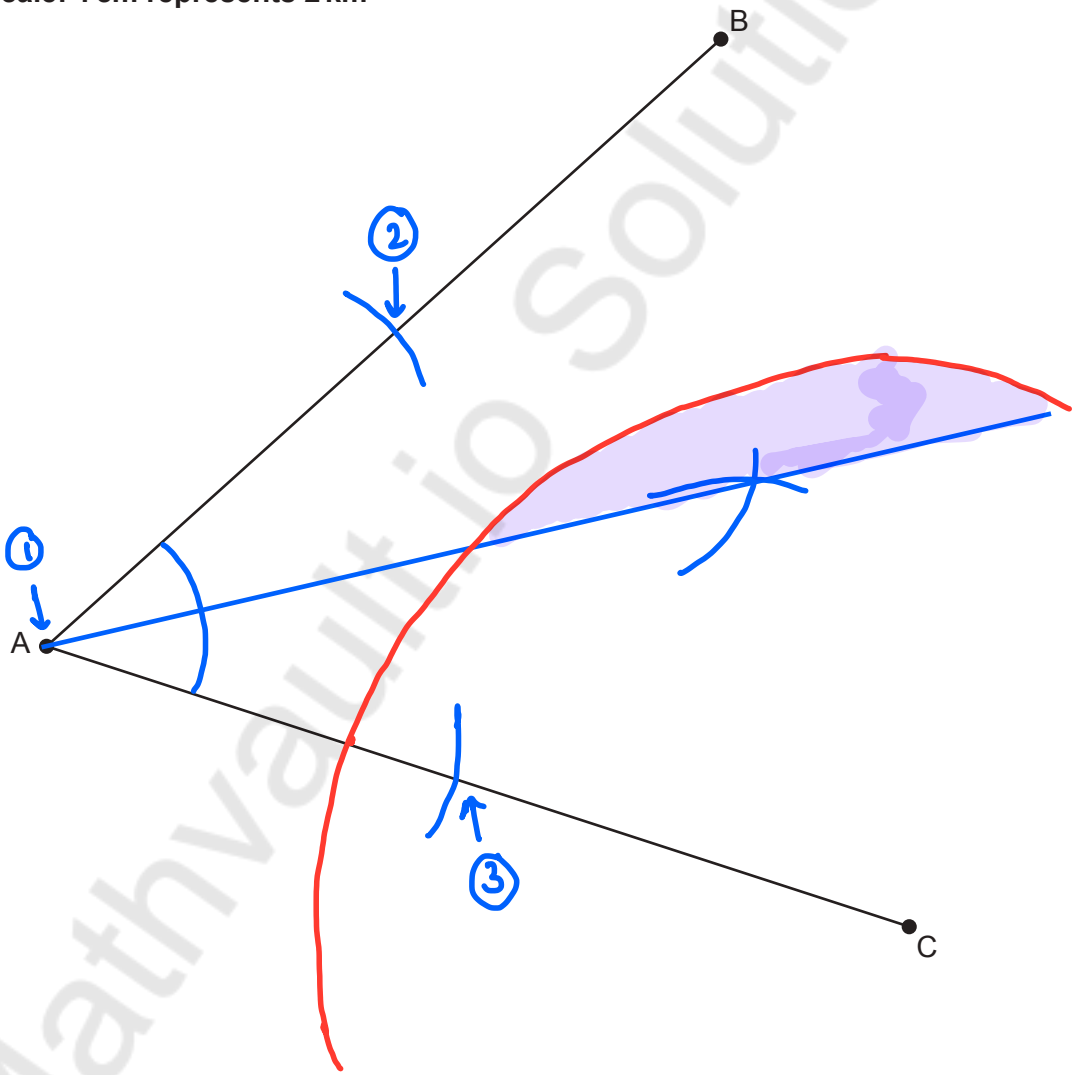
- nearer to the road from A to B than the road from A to C,
- less than 14 km from town C.

angle bisector

×7 1cm = 2km ×7
7cm = 14km

(a) Using construction, shade the region where the shopping centre could be built.
Show all your construction lines.

Scale: 1 cm represents 2 km



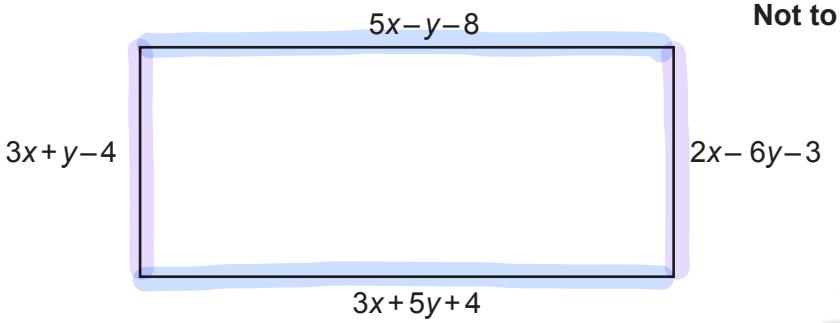
[5]

(b) Explain why the region found in part **(a)** may not be an appropriate site for the shopping centre.

Roads are not straight.

..... **[1]**

21 The dimensions, in centimetres, of this rectangle are shown as algebraic expressions.



Not to scale

Work out the length and width of the rectangle.

$3x+y-4 = 2x-6y-3$

$-2x \quad +6y \quad +4 \quad -2x \quad +6y \quad +4$

$x + 7y = 1$

$5x-y-8 = 3x+5y+4$

$-3x \quad -5y \quad +8 \quad -3x \quad -5y \quad +8$

$2x - 6y = 12$

$2x - 6y = 12$

$x + 7y = 1 \quad \} \times 2$

$2x - 6y = 12$

$2x + 14y = 2$

$-20y = 10$

$\div -20 \qquad \div -20$

$y = -0.5$

$x + 7y = 1$

$x + 7(-0.5) = 1$

$x - 3.5 = 1$

$+3.5 \qquad +3.5$

$x = 4.5$

Length $3x + 5y + 4$

$3(4.5) + 5(-0.5) + 4$

$= 15$

Width $3x + y - 4$

$3(4.5) + (-0.5) - 4$

$= 9$

length = 15 cm

width = 9 cm

[6]

END OF QUESTION PAPER