

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write the number five thousand nine hundred and seventeen in figures.

.....5,917.....

(Total for Question 1 is 1 mark)

2 Write $\frac{7}{10}$ as a percentage.

$$\frac{7}{10} \times 10 \rightarrow \frac{70}{10} \times 10 \rightarrow 70$$

.....70.....%

(Total for Question 2 is 1 mark)

3 Simplify $q + q + q + q$

.....4q, (not q^4).....

(Total for Question 3 is 1 mark)

4 Change 4 kilograms into grams.

$$\begin{array}{l} 1 \text{ kg} = 1000 \text{g} \\ \times 4 \downarrow \\ 4 \text{ kg} = 4000 \text{g} \end{array}$$

.....4000..... grams

(Total for Question 4 is 1 mark)

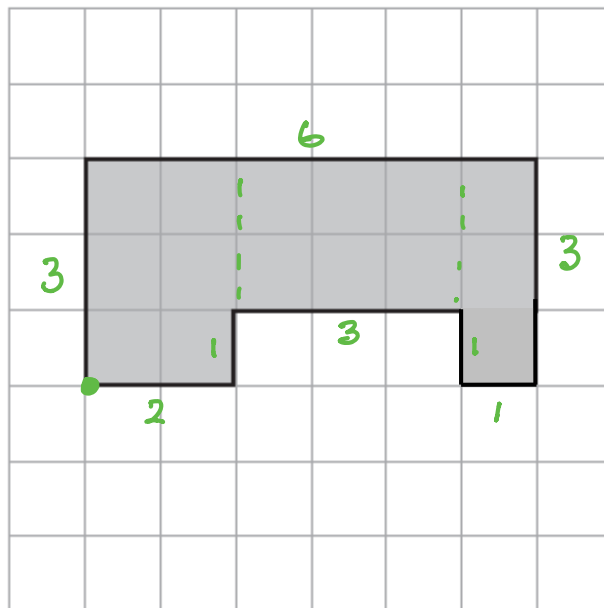
5 -2 5 -3 4 1

Write these numbers in order of size.
Start with the smallest number.

.....-3, -2, 1, 4, 5.....

(Total for Question 5 is 1 mark)

6 The diagram shows a shape on a centimetre grid.



(a) Find the perimeter of the shape.

$$3 + 6 + 3 + 1 + 1 + 3 + 1 + 2$$

$$=$$

..... 20 cm
(1)

(b) Find the area of the shape.

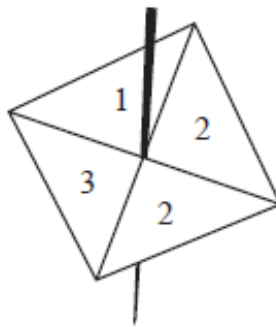
$$2 \times 3 + 3 \times 2 + 3 \times 1$$

$$= 6 + 6 + 3$$

..... 15 cm²
(1)

(Total for Question 6 is 2 marks)

7 Here is a 4-sided spinner.



Samina spins the spinner once.

(a) Choose the word that best describes the probability that the spinner lands on 1

impossible	unlikely	evens	likely	certain
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$\frac{1}{4}$

..... unlikely

(1)

(b) Choose the word that best describes the probability that the spinner lands on a number greater than 3

impossible	unlikely	evens	likely	certain
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..... impossible

(1)

Rosanna rolls a biased dice once.

The probability that she gets the number 6 is 0.2

(c) Work out the probability that Rosanna does **not** get the number 6

$$1 - 0.2 = 0.8$$

..... 0.8

(1)

(Total for Question 7 is 3 marks)

8 A quadrilateral has 4 straight sides and one pair of parallel sides .

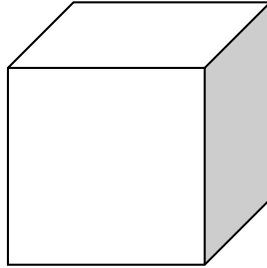
(a) Write down the mathematical name of this quadrilateral.



Trapezium

(1)

The diagram shows a solid shape.



(b) Write down the mathematical name of this shape.

cube
(or cuboid) (1)

(Total for Question 8 is 2 marks)

9 The table shows the number of films watched by four people in one week.

Person	Number of films
Kim	2
Ali	5
Sam	9
Belle	4

(a) Work out the mean number of films.

$$2 + 5 + 9 + 4 = 20$$

$$20 \div 4 = 5$$

..... 5

(2)

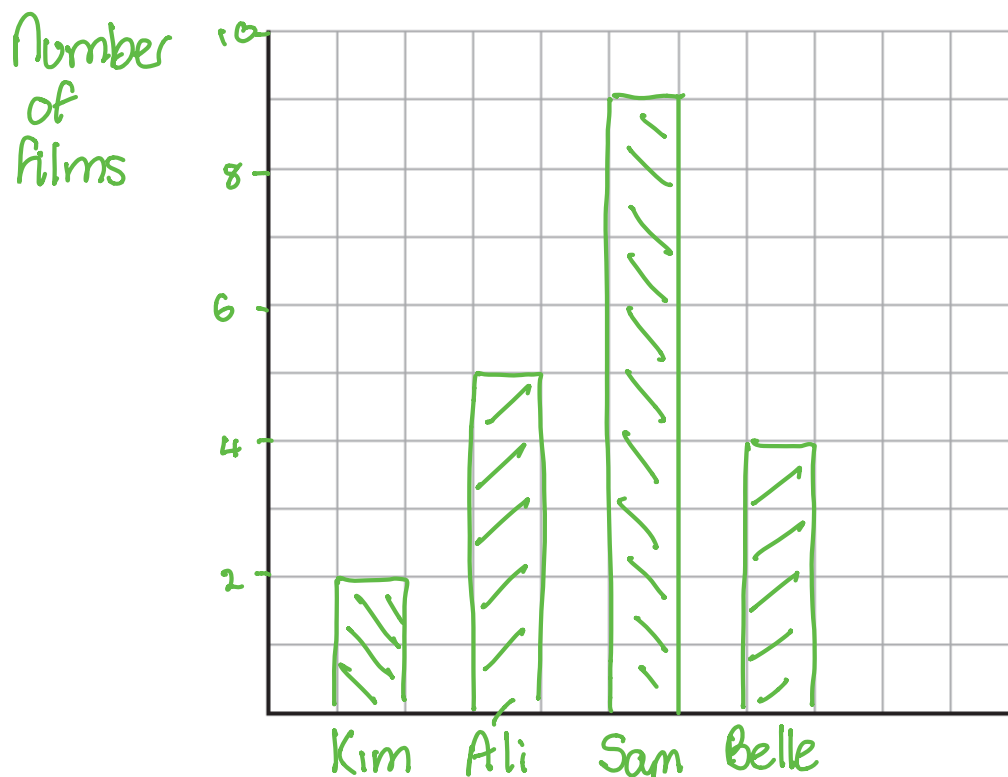
(b) Find the range.

$$9 - 2 = 7$$

..... 7

(1)

(c) On the grid, draw a bar chart to show the information in the table.



(3)

(Total for Question 9 is 6 marks)

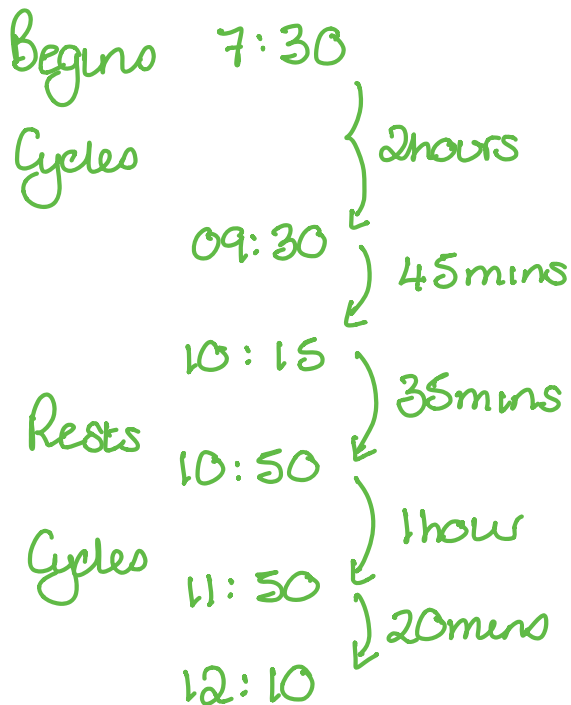
- 10 Wendy begins cycling at 7 30 a.m.
She cycles for 2 hours and 45 minutes. ✓

Wendy then rests for 35 minutes.

She then cycles for 80 minutes to a train station. 1 hr 20 mins

Does Wendy get to the train station before 12 noon?

You must show how you get your answer.



No, Wendy arrives at 12:10
which is after 12 noon.

(Total for Question 10 is 4 marks)

11 Gary thinks of a number.

He multiplies his number by 3 and then subtracts 11
His answer is 40

What number did Gary think of?

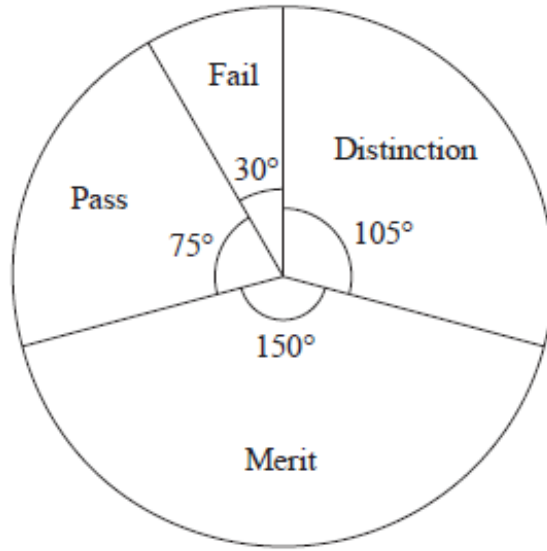
$$\begin{aligned} _ \times 3 &= _ - 11 = 40 \\ 51 \div 3 &= 17 & 40 + 11 &= 51 \end{aligned} \quad \leftarrow$$

check $17 \times 3 = 51$
 $51 - 11 = 40 \checkmark$

17

.....
(Total for Question 11 is 3 marks)

12 Some students took a piano exam.
The pie chart shows information about the grades the students got.



(a) Write down the modal grade.

Merit

(1)

30 students got merit.

(b) Work out the total number of students who took the piano exam.

$$\begin{aligned}
 30 \text{ students} &= 150^\circ \\
 6 \text{ students} &= 30^\circ \quad \div 5 \\
 \downarrow \times 12 & \\
 72 \text{ students} &= 360^\circ \quad \times 12
 \end{aligned}$$

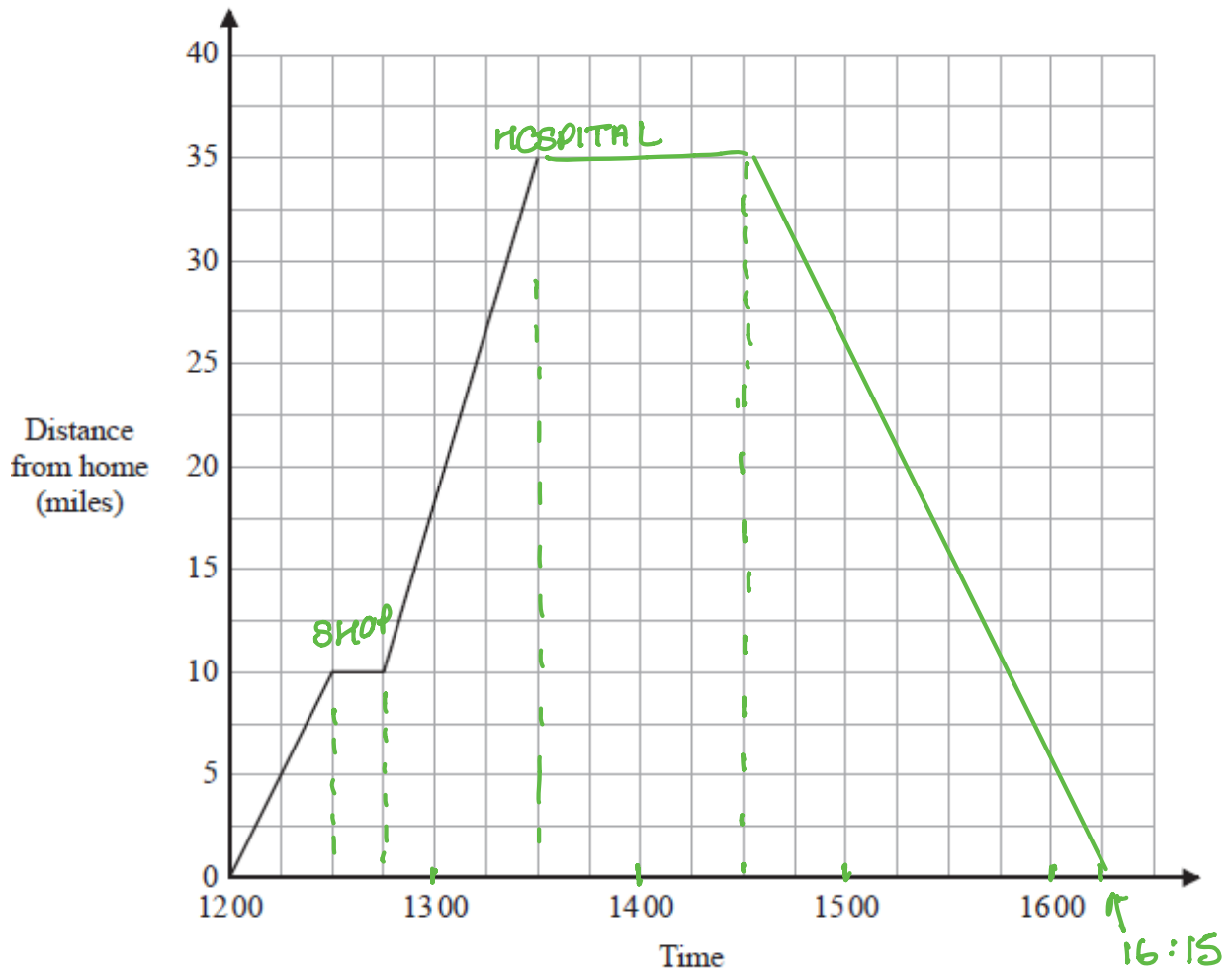
72

(3)

(Total for Question 12 is 4 marks)

13 Rosalind drove from her home to a hospital.

Here is a travel graph for her journey.



Rosalind stopped at a shop on her way to the hospital.

(a) (i) How many minutes did Rosalind take to drive to the shop?

12 to 12:30

..... 30 minutes
(1)

(ii) Write down the distance from Rosalind's home to the shop.

..... 10 miles
(1)

Rosalind stayed at the hospital for 1 hour. ✓

She then drove home without stopping.

Rosalind arrived home at 16 15

(b) On the grid, complete the travel graph. ✓

(2)

(c) Work out the average speed for the journey from the hospital to Rosalind's home.

$$35 \text{ miles} = 1 \text{ hr } 45 \text{ mins}$$

$$\div 7$$

$$5 \text{ miles} = 15 \text{ mins}$$

$$\times 4$$

$$20 \text{ miles} = 1 \text{ hour}$$

.....20..... miles per hour

(1)

(Total for Question 13 is 5 marks)

14 280 exercise books cost £70

320 pens cost £110

An exercise book is cheaper than a pen.

How much cheaper?

Give your answer in pence correct to 1 decimal place.

$$280 \text{ books} = £70$$

$$320 \text{ pens} = £110$$

$$1 \text{ book} = 70 \div 280$$

$$1 \text{ pen} = 110 \div 320$$

$$= £0.25$$

$$= £0.34375$$

OR

OR

$$25p$$

$$34.375p$$

$$\text{Difference} = 34.375 - 25$$

$$= 9.375$$

$$1 \text{ dp} = 9.4$$

.....9.4.....p

(Total for Question 14 is 4 marks)

15 There are only blue beads and yellow beads in a box.

$$\text{number of blue beads} : \text{number of yellow beads} = 2 : 3$$

There are 42 blue beads in the box.

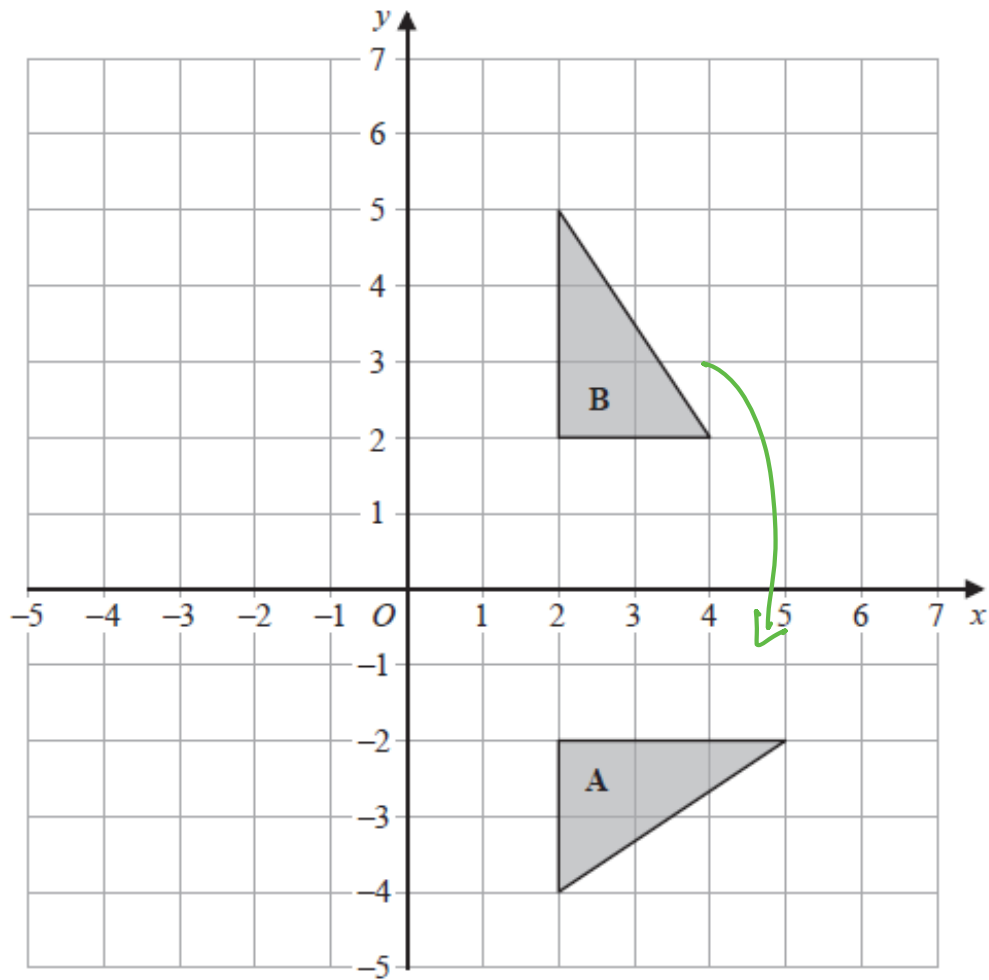
Work out the total number of beads in the box.

LOOK \nearrow

$$\begin{array}{l} \text{Blue} : \text{Yellow} \\ 2 : 3 \\ \times 21 \quad \downarrow \quad \times 21 \\ 42 : 63 \\ \text{Total} = 105 \end{array}$$

.....105.....

(Total for Question 15 is 2 marks)

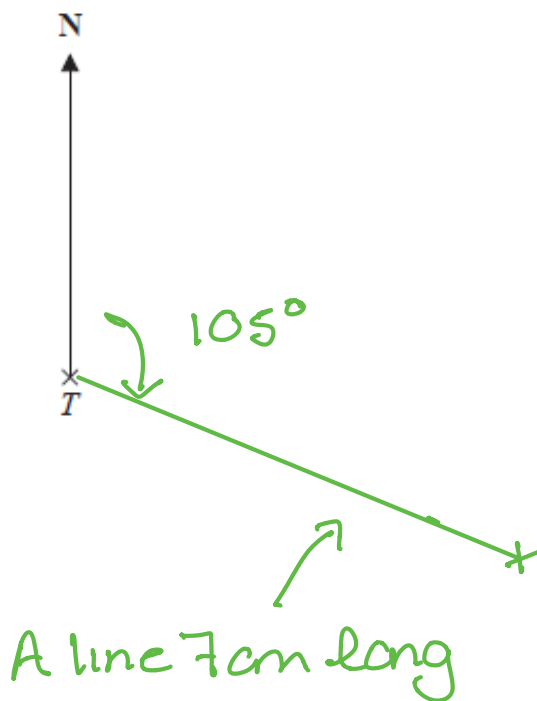


Describe fully the single transformation that maps shape **B** onto shape **A**.

Rotation, 90° clockwise, centre (0,0)

(Total for Question 16 is 2 marks)

17 The diagram shows the position of a phone mast T .



1 cm = 5 km
7 cm = 35 km

Phone mast P is 35 km from phone mast T on a bearing of 105°

Mark the position of phone mast P with a cross (\times).

Use a scale of 1 cm to 5 km.

(Total for Question 17 is 2 marks)

18 Solve $5(3x - 7) = 40$

$$15x - 35 = 40$$
$$+ 35 \quad + 35$$

$$15x = 75$$
$$\div 15 \quad \div 15$$

$$x = 5$$

$$x = \underline{\quad 5 \quad}$$

(Total for Question 18 is 3 marks)

19 Julia invests £5000 for 4 years at $S\%$ simple interest per year. (not compound)

At the end of the 4 years, Julia has received a total of £700 in interest.

Work out the value of S .

$$700 = 4 \text{ years interest}$$

$$700 \div 4 = 175 = 1 \text{ year interest}$$

$$\frac{175}{5000} \times 100$$

$$= 3.5\%$$

$$S = \underline{\quad 3.5 \quad}$$

(Total for Question 19 is 3 marks)

20 (a) Simplify $(k^3)^4$

$$k^{3 \times 4}$$

$$k^{12}$$

(1)

(b) Simplify $y^6 \times y^9$

$$y^{6+9}$$

$$y^{15}$$

(1)

(c) Expand $5m^2(m^2 + 2m)$

$$5m^2 \times m^2 = 5m^4$$

$$5m^2 \times 2m = 10m^3$$

$$5m^4 + 10m^3$$

(2)

(Total for Question 20 is 4 marks)

21 Jenny wants to know how many sandwiches she will need for 550 people at a meeting.

Each person who eats sandwiches will eat 3 sandwiches.

2 slices of bread are needed for each sandwich.

Jenny assumes 76% of the people will eat sandwiches. (i)

(a) Using this assumption, work out the number of slices of bread Jenny needs.

Give your answer correct to the nearest hundred slices.

$$550 \times 0.76 = 418 \text{ will eat sandwiches}$$

$$418 \times 3 = 1254 \text{ sandwiches}$$

$$1254 \times 2 = 2508 \text{ slices of bread.}$$

$$\approx 2500$$

..... 2500 slices

(4)

Jenny's assumption is wrong.

68% of the people will eat sandwiches.

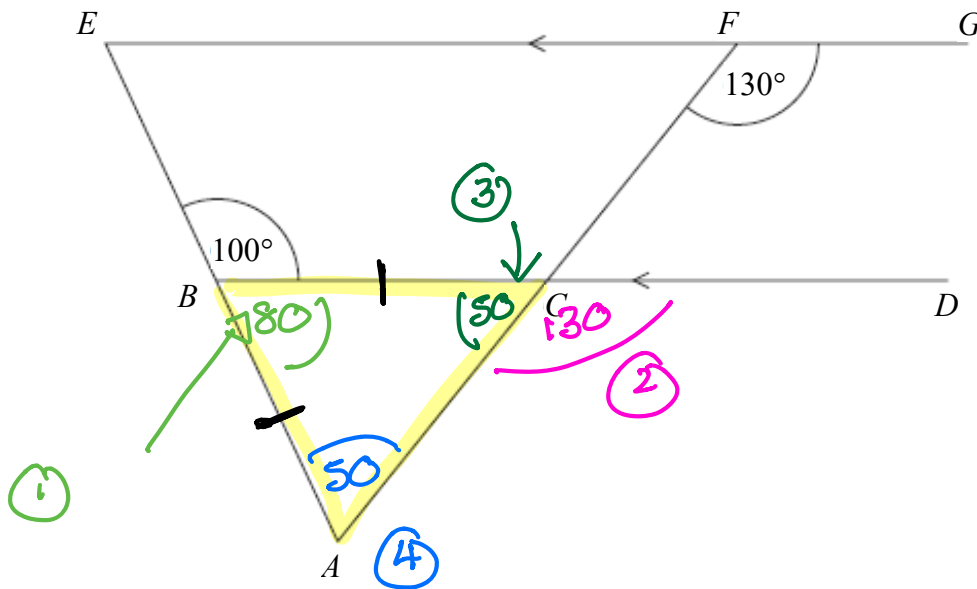
(b) How does this affect your answer to part (a)?

..... My answer will be less than 2500, so
..... Jenny would need fewer slices of bread.

(1)

(Total for Question 21 is 5 marks)

- 22 *ACF* and *ABE* are straight lines.
EFG and *BCD* are parallel lines.



Show that triangle *ABC* is isosceles.
 Give a reason for each stage of your working.

① angles on a straight line add up to 180°
 $180 - 100 = 80$

② corresponding angles are equal

③ angles on a straight line add up to 180
 $180 - 130 = 50$

④ $BAC = 180 - (80 + 50) = 50$ Angles in a triangle
 add up to 180°

TRIANGLE *ABC* IS ISOSCELES AS IT HAS TWO
 EQUAL ANGLES.

(Total for Question 22 is 5 marks)

23 It takes 24 hours for 9 identical pumps to fill a swimming pool. **INVERSE PROPORTION**

How many hours would it take 15 of these pumps to fill another swimming pool of the same size?

$$\begin{array}{l} 9 \text{ pumps} = 24 \text{ hours} \\ \div 9 \downarrow \qquad \qquad \qquad \underline{\underline{\times 9}} \downarrow \\ 1 \text{ pump} = 216 \text{ hours} \\ \qquad \qquad \qquad \qquad \qquad \qquad \qquad \downarrow \div 15 \\ \times 15 \downarrow \qquad \qquad \qquad 15 \text{ pumps} = 14.4 \text{ hours} \end{array}$$

..... 14.4 hours

(Total for Question 23 is 2 marks)

24 P and Q are numbers such that

$$P = 2^3 \times 3^5 \times 5$$

$$Q = 3^2 \times 5^3$$

(a) Find the highest common factor (HCF) of P and Q .

$$\begin{array}{l} P = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 5 \\ Q = 3 \times 3 \times 5 \times 5 \times 5 \end{array}$$

$$\begin{aligned} \text{HCF} &= 3 \times 3 \times 3 \\ &= 27 \end{aligned}$$

45

(1)

(b) Find the lowest common multiple (LCM) of P and Q .

$$\begin{aligned} \text{LCM} &= 45 \times 2^3 \times 3^3 \times 5^2 \\ &= 243000 \end{aligned}$$

243000

(2)

(Total for Question 24 is 3 marks)

25 Sludge leaks from a pipe at a constant rate of $8.7 \text{ m}^3/\text{s}$

How many hours does it take for $98\,310 \text{ m}^3$ of sludge to leak from the pipe?

Give your answer correct to the nearest hour. = $60 \times 60 = 3600$ seconds

$$8.7 \text{ m}^3 = 1 \text{ second}$$

$$\text{so } \frac{98310 \text{ m}^3}{8.7 \text{ m}^3} = 11300 \text{ seconds}$$

$$11300 \div 3600$$

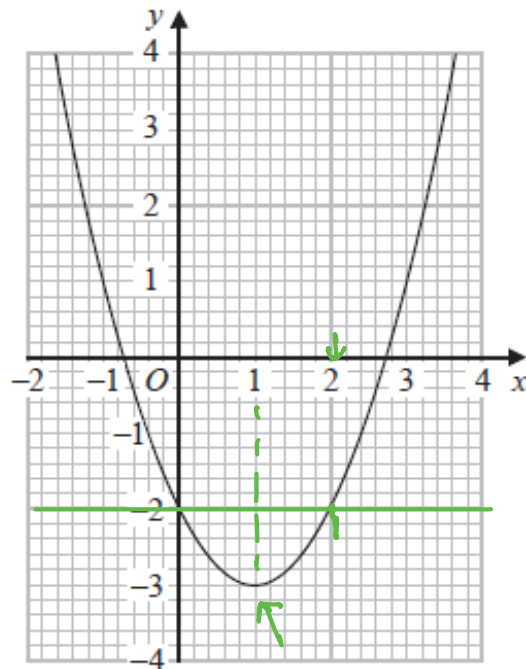
$$= 3.138$$

$$\text{so } 3$$

.....3..... hours

(Total for Question 25 is 3 marks)

26 Here is the graph of $y = x^2 - 2x - 2$



(a) Write down the coordinates of the turning point on the graph of $y = x^2 - 2x - 2$

(..... 1 , -3)
(1)

(b) Write down an estimate for one of the roots of $x^2 - 2x - 2 = -2$

..... 0 or 2
(1)

(Total for Question 26 is 2 marks)

- 27 A solid cube is made of stone.
 The stone has a density of 3.5 g/cm^3
 The volume of the cube is 216 cm^3
 Work out the mass of the cube.

$$3.5 \text{ g} = 1 \text{ cm}^3$$

$$756 = 216 \text{ cm}^3 \downarrow \times 216$$

..... g
 (Total for Question 27 is 2 marks)

- 28 (a) Write $(2.5 \times 10^3) : (7.5 \times 10^4)$ in the form $1 : n$ where n is an integer.

$$2500 : 75000$$

$$1 : 30$$

.....
 (2)

- (b) Write the following numbers in order of size.
 Start with the smallest number.

³ 6125	² 612500×10^{-4}	⁴ 6.125×10^5	¹ 0.006125×10^3
6125	61.25	612500	6.125

.....
 (2)

(Total for Question 28 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS