Surname	Centre Number	Candidate Number
Other Names		0

WJEC CBAC

GCSE

4370/03

SOLUTIONS

MATHEMATICS – LINEAR
PAPER 1
FOUNDATION TIER

A.M. MONDAY, 9 June 2014

1 hour 45 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **3**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	10	
2.	6	
3.	6	
4.	3	
5.	6	
6.	6	
7.	3	
8.	4	
9.	4	
10.	6	
11.	4	
12.	2	
13.	6	
14.	5	
15.	6	
16.	4	
17.	4	
18.	4	
19.	3	
20.	3	
21.	5	
Total	100	

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J U N 1 4 4 3 7 0 0 3 0 1

Examiner only

1. *(a)* (i) Write down, in figures, the number three million, four hundred and eleven thousand and two. [1]

3 411 002

(ii) Write down, in words, the number 72 065. [1]

Seventy-two thousand and sixty five

(b) Using the following list of numbers

17 6 53 40 63 36 39 81

write down

(i) two numbers that add up to 80, [1]

17 and 63

(ii) the number that is the difference between 67 and 28, [1]

39

(iii) a multiple of 7, [1]

63

(iv) the answer when 48 is divided by 8, [1]

6

(v) the square of 9. [1]

81

(c) Write down a factor of 96 which is between 10 and 20. [1]

12

(d) Write 6571

(i) correct to the nearest 10, [1]

6570

(ii) correct to the nearest 100. [1]

6600

4370 030003

Examiner only

2. *(a)* Each of the digits 5, 2, 6 and 7 is used once to make a four-digit number.

(i) What is the largest number that can be made? [1]

7652

(ii) What is the smallest even number that can be made? [1]

2576

(b) Find the value of each of the following.

(i) 0·2 × 0·3 [1]

0·06

(ii) 6·2 – 3·28 [1]

2·92

$$\begin{array}{r} {\scriptstyle 5\ 1\ 1} \\ 6\cdot\not{2}0 \\ -\ 3\cdot28 \\ \hline 2\cdot92 \end{array}$$

(c) Estimate the value of 2·9 × 98·2. [2]

$\approx 3 \times 100$

≈ 300

Examiner only

3. *You will be assessed on the quality of your written communication in this question.*

A window cleaner takes 15 minutes to clean each window in a large building.
He charges using the following formula:

payment = £8 × number of hours worked + call-out charge

Calculate the payment for cleaning 20 windows when the call-out charge is £12. [6]

Payment = $8 \times (20 \div 4) + 12$

Number of hours worked = $20 \div 4 = 5$ hrs

or 20 lots of 15 mins

$= 20 \times \frac{1}{4}$ hr $= 5$ hrs

Payment $= (8 \times 5) + 12$

$= 40 + 12$

$= £52$

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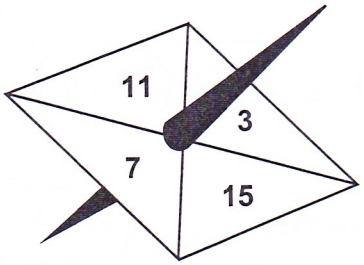
Examiner only

4. Choose the best word from those given below to describe the chance of each of the following events occurring.

impossible **unlikely** **even chance** **likely** **certain**

(a) You get an odd number when the following spinner is spun once. [1]



certain

(b) You win a raffle when 200 tickets are sold and you have bought one. [1]

unlikely

(c) You get an even number when a fair dice is rolled once. [1]

even chance

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5. *(a)* Write down the next term in **each** of the following sequences. [2]

(i) 15, +6→ 21, +6→ 27, +6→ 33, +6→ 39

(ii) 62, 56, 51, 47, 44

−6 −5 −4 −3

(b) Describe, in words, the rule for continuing the sequence 48, 12, 3, $\frac{3}{4}$, ... [1]

÷ each term by 4 to get the next term

(c) Find the value of $p = 3a + 4b - 6c$ when $a = 2$, $b = 3$ and $c = -1$. [2]

$p = 3(2) + 4(3) - 6(-1)$

(d) Simplify $5x + 2x - 3x$. [1]

$4x$

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6. Two rectangles, each 9 cm by 3 cm, and an overlapping rectangle, 8 cm by 3 cm, are placed so that they make the H shape shown in the diagram.

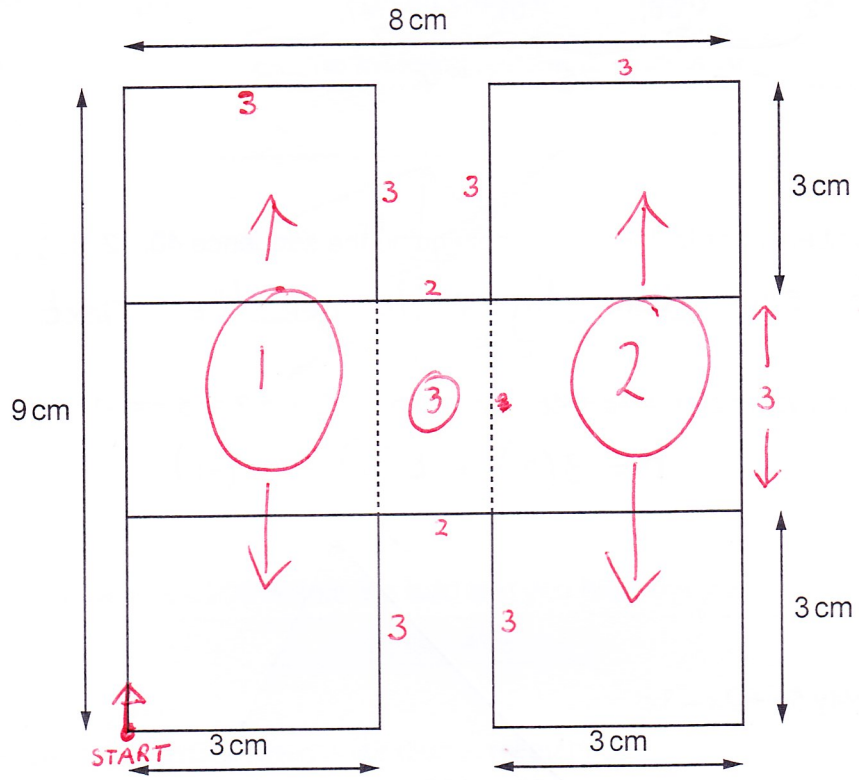


Diagram not drawn to scale

(a) Calculate the perimeter of the shape. [3]

$P = 9 + 3 + 3 + 2 + 3 + 3 + 9 + 3 + 3 + 2 + 3 + 3$

$P = 46\text{cm}$

(b) Calculate the area of the shape.
Write down the units of your answer. [3]

$A = (1) + (2) + (3)$

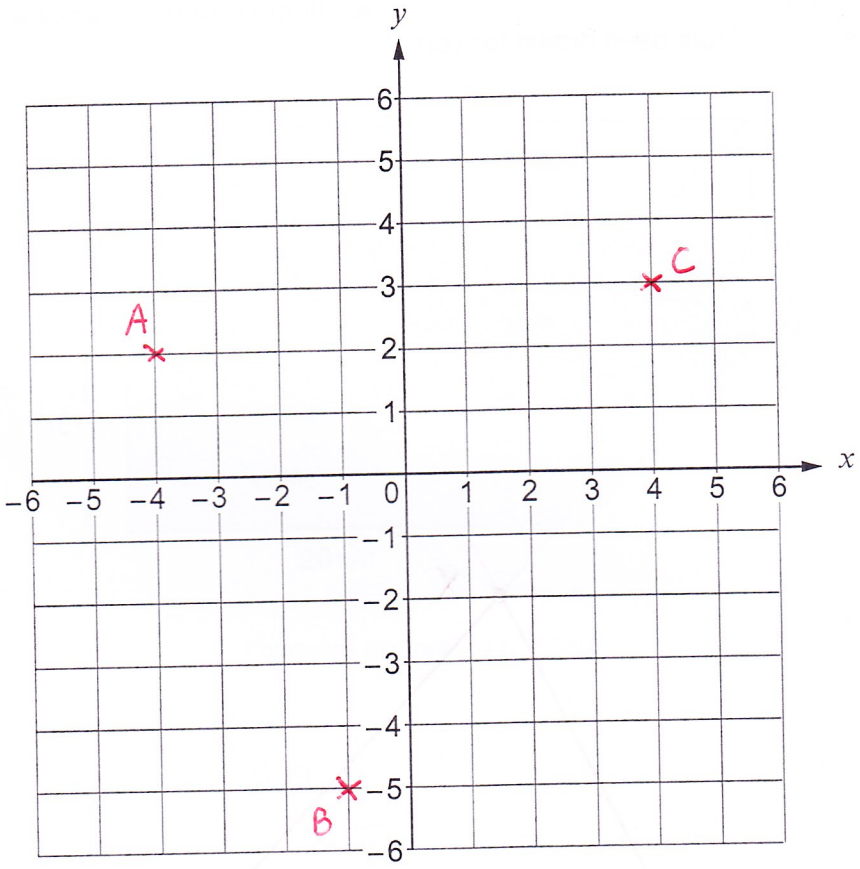
$= (9 \times 3) + (9 \times 3) + (2 \times 3)$

$= 27 + 27 + 6$

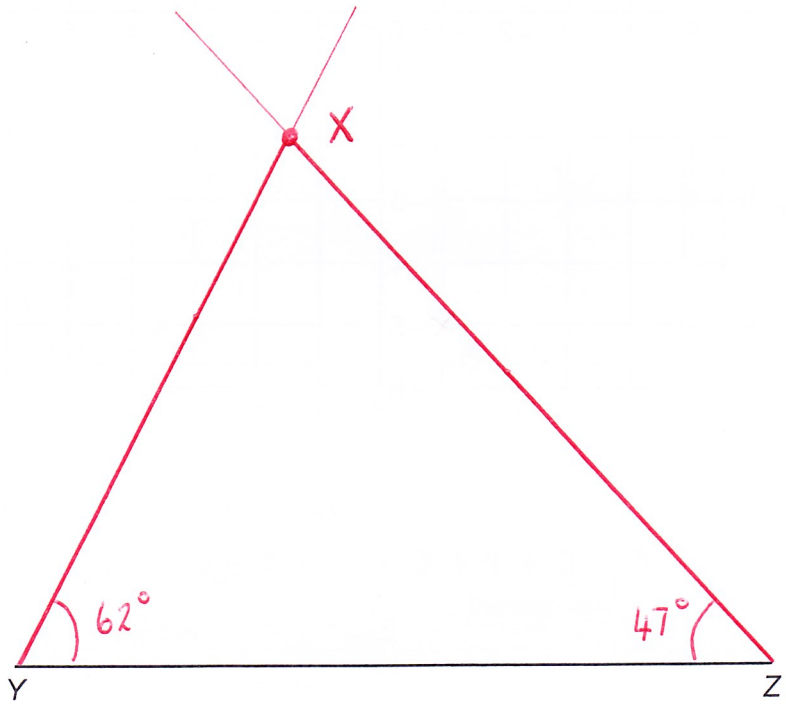
$= 60\ \text{cm}^2$

Examiner only

7. On the squared paper below, plot the points $A(-4, 2)$, $B(-1, -5)$ and $C(4, 3)$. [3]



8. *(a)* Complete an accurate drawing of triangle XYZ in which $YZ = 10\,\text{cm}$, $\hat{XYZ} = 62°$ and $\hat{XZY} = 47°$.
The side YZ has been drawn for you. [3]



(b) Write down the special name given to an angle which is more than 90°, but less than 180°. [1]

OBTUSE

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9. A rectangular tank has a length of 20 cm, a width of 15 cm and a height of 10 cm.
Water is poured into the tank until it is half full.
Calculate the volume of the water in **litres**. [4]

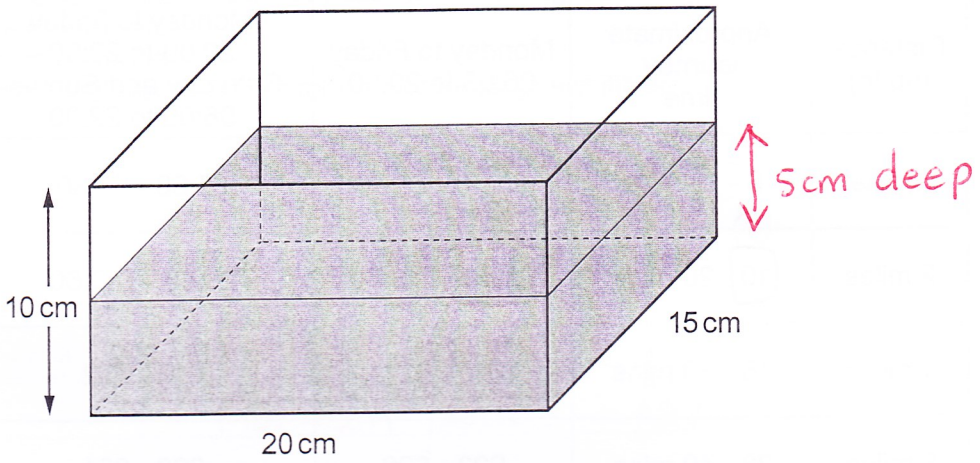

Diagram not drawn to scale

$V = l\,b\,h$ (volume of a cuboid)

$V = 20 \times 15 \times 5$

$V = 300 \times 5$

$V = 1500\ cm^3$

Now $1cm^3 = 1ml$ and $1000ml = 1$ litre

$V = 1500 \div 1000$

$V = 1.5$ litres

4370

10. The table shows typical ranges for fares and journey times for London taxis.

London Taxis		Tariff 1	Tariff 2	Tariff 3
Distance (up to)	Approximate journey time	Monday to Friday 06:00 to 20:00	Monday to Friday 20:00 to 22:00 Saturday and Sunday 06:00 to 22:00	Every night 22:00 to 06:00
1 mile	6 - 13 mins	£5.60 - £8.60	£5.60 - £8.80	£6.60 - £8.80
2 miles	10 - 20 mins	£8.40 - £13.40	£8.80 - £13.60	£10.20 - £14.40
4 miles	16 - 30 mins	£15 - £21	£16 - £22	£17 - £27
6 miles	28 - 40 mins	£23 - £28	£28 - £31	£28 - £32

Example:
A journey of 5 miles at midnight would cost between £28 and £32, depending on the length of time of the journey.

Use the table to answer the following questions.

(a) Peter hires a taxi on a Thursday at 10:25 a.m. for a journey of 2 miles.
What is the least amount he should be charged and what would be the earliest time he would get there? [2]

Least amount charged £8.40 Earliest time 10:35 am

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(b) Joanna and her 4 friends are out together on a Friday at 23:30 p.m.

They are staying at the same hotel, which is about $3\frac{1}{2}$ miles away.

They could hire a taxi or they could buy tickets on the underground tube costing £4 each.
For the 5 friends, explain how it is possible that hiring a taxi might

- save money, or
- cost more money.

You must show all your working for both of these possibilities. [4]

Underground cost = 5 × 4 = £20

Taxi cost. Minimum possible = £17

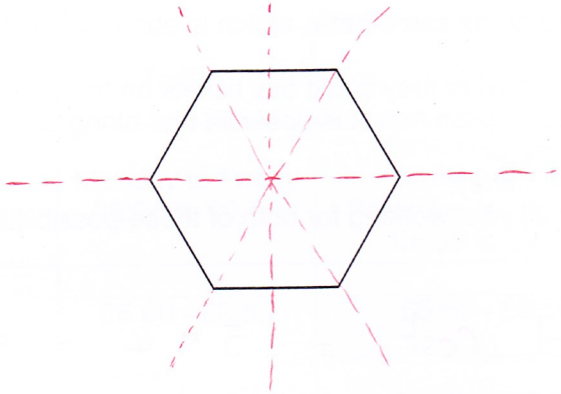
Maximum possible = £27

∴ Friends could be 20 − 17 = £3 better off with a taxi

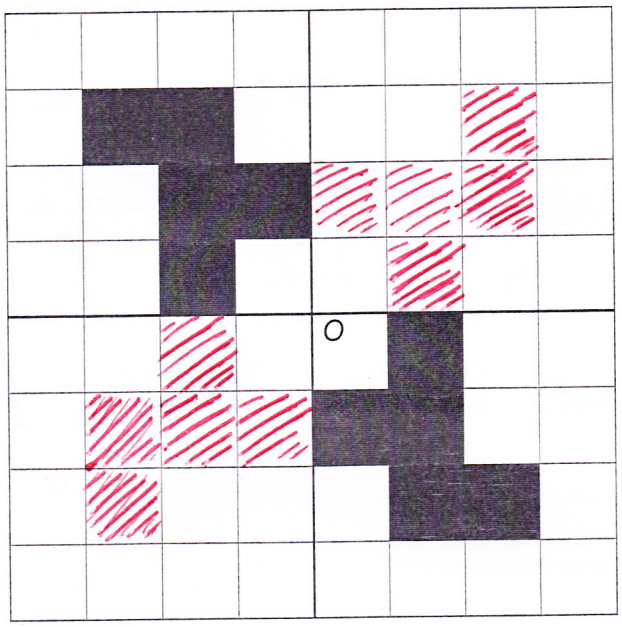
OR

Friends could be 27 − 20 = £7 worse off with a taxi.

11. *(a)* Draw all the lines of symmetry on the following diagram. [2]



(b) Draw two more shapes so that the completed pattern has rotational symmetry of order 4 about *O*. [2]



Examiner only

12. Calculate the value of $\frac{3}{8}$ as a decimal. [2]

$= 3 \div 8$

$= 0.375$

$$8 \overline{)3.0^{3}0^{4}0} \quad 0.375$$

Make sure you put 3 in the box and 8 outside

13. There are four balls numbered 2, 2, 3 and 4 respectively in machine A and four balls numbered 3, 4, 5 and 6 respectively in machine B.
In a game, both machines A and B select one ball at random.
The score for the game is the 2-digit number whose units digit is the number from machine A and whose tens digit is the number from machine B.

For example, if the number on the ball from machine A is 4 and the number on the ball from machine B is 3, the score is 34.

(a) Complete the following table to show all the possible scores. [2]

Machine B \ Machine A	2	2	3	4
6	62	62	63	64
5	52	52	53	54
4	42	42	43	44
3	32	32	33	34

16 outcomes

A player wins a prize by getting a score of 42 or less.

(b) (i) Matthew plays the game once. What is the probability that he wins a prize? [2]

$\frac{6}{16} = \frac{3}{8}$ (There are 6 scores of 42 or less in the table)

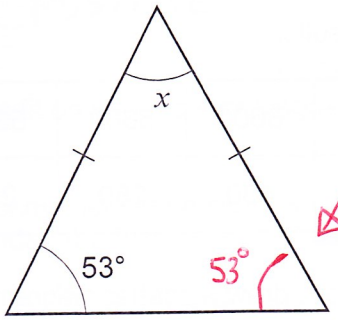
(ii) One day 400 people play this game once. Approximately how many would you expect to win a prize? [2]

$\frac{6}{16} = \frac{3}{8} \xrightarrow{\times 5} \frac{15}{40} \xrightarrow{\times 10} \frac{150}{400}$

$\therefore$ 150 expected to win

Examine only

14. *(a)* Find the size of angle x. [2]



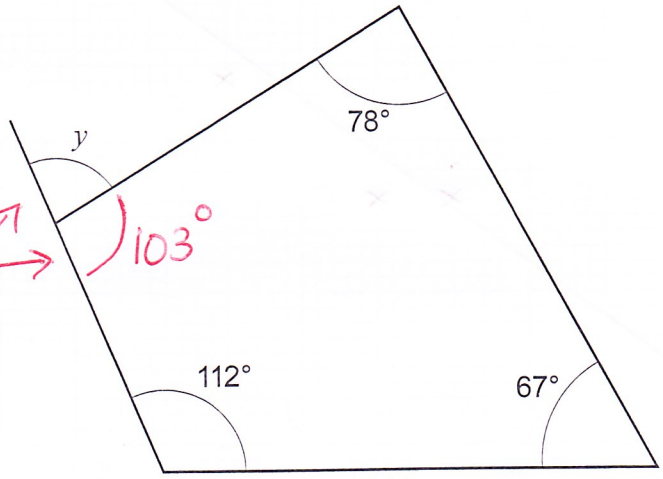
Isosceles angles are the same

Diagram not drawn to scale

53 + 53 = 106° 180 − 106 = 74°

x = 74 °

(b) Find the size of angle y. [3]



Add up to 180

Angles in quad add up to 360°

Diagram not drawn to scale

112 + 78 + 67 = 112 + 78 + 67 = 257°

Angles in Quad

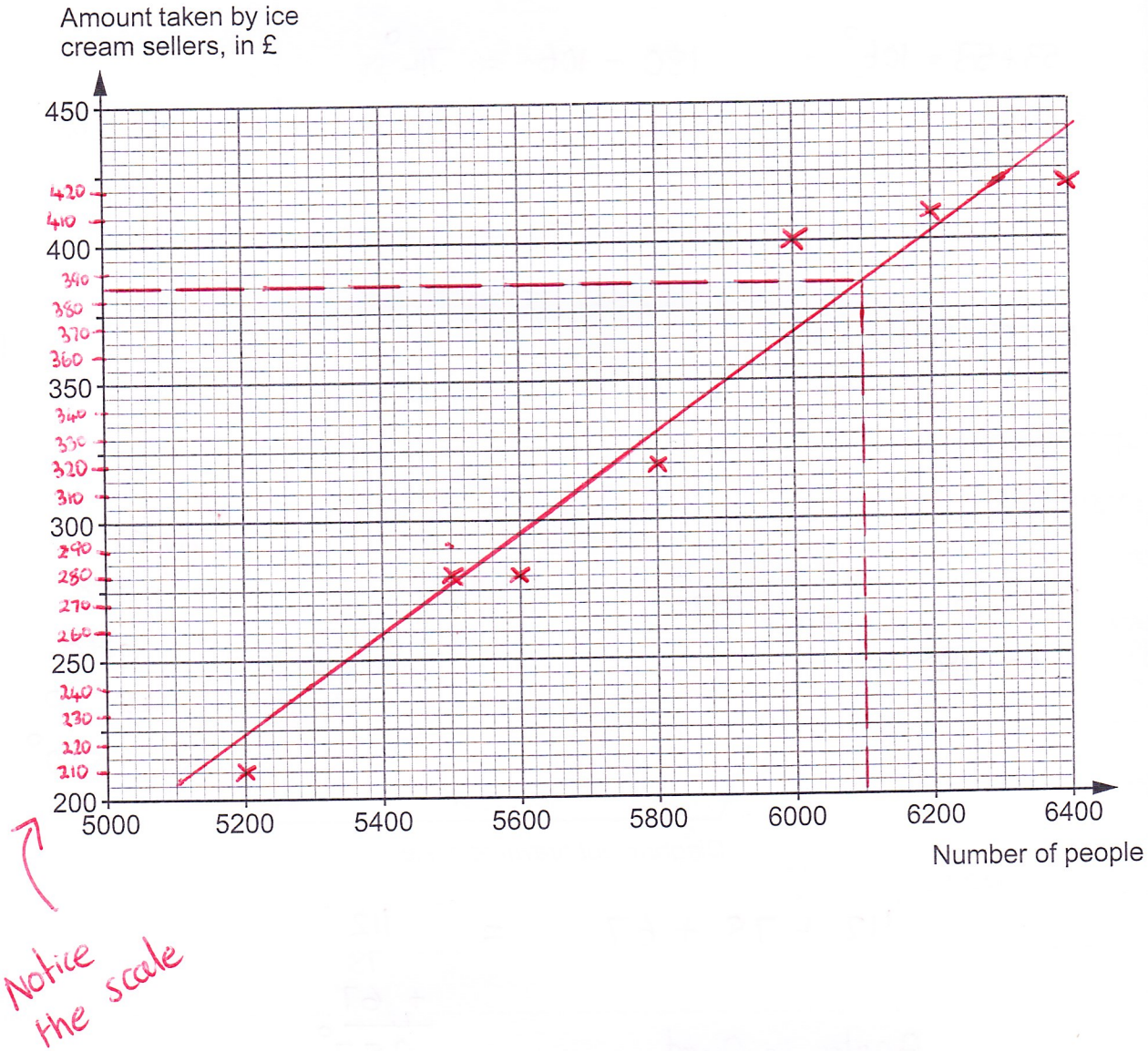
360 − 257 = 103° Then 180 − 103 = 77°

y = 77 °

15. A festival took place over 7 days in August.
Each day, the number of people at the festival and the amount of money taken by the ice cream sellers were recorded.
The table below shows the results.

Number of people	5500	6000	5600	5200	5800	6400	6200
Amount taken by ice cream sellers, in £	280	400	280	210	320	420	410

(a) On the graph paper below, draw a scatter diagram of these results. [2]



Notice the scale

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(b) Write down the type of correlation that is shown by the scatter diagram. [1]

POSITIVE

(c) Draw, by eye, a line of best fit on your scatter diagram [1]

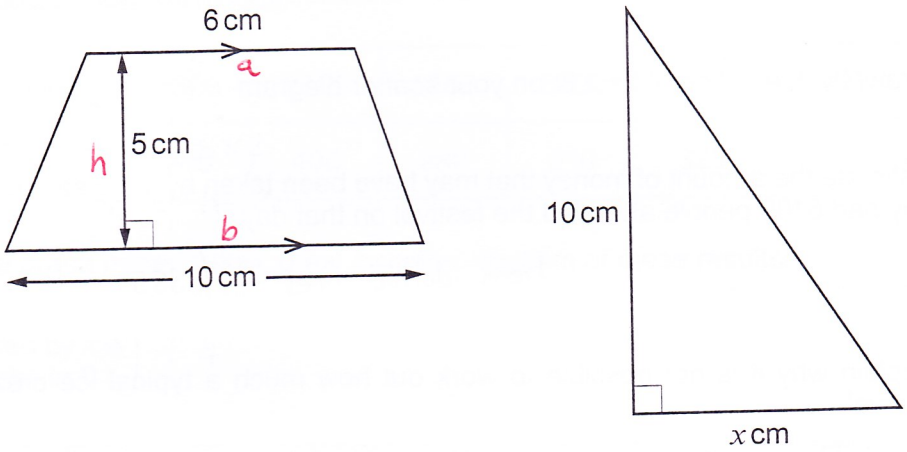
(d) Estimate the amount of money that may have been taken by ice cream sellers during one day had 6100 people attended the festival on that day. [1]

From dotted lines £385

(e) Explain why it is not possible to work out how much a typical ice cream costs at the festival. [1]

The figures for the number of people are for those at the festival, not for those who actually bought an ice cream.

16. The area of the trapezium is equal to the area of the right-angled triangle.



Diagrams not drawn to scale

Calculate the value of x. [4]

Area trapezium $A = \frac{(a+b)h}{2} = \frac{(6+10)5}{2} = \frac{(16)(5)}{2}$

$= 40\ cm^2$

Area triangle $A = \frac{bh}{2} = \frac{x(10)}{2} = 5x\ cm^2$

If the areas are the same

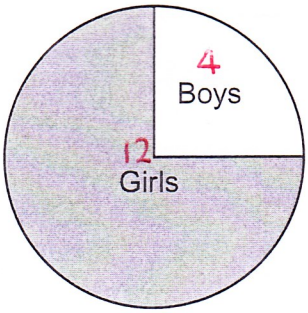
$40 = 5x$

$\frac{40}{5} = x$

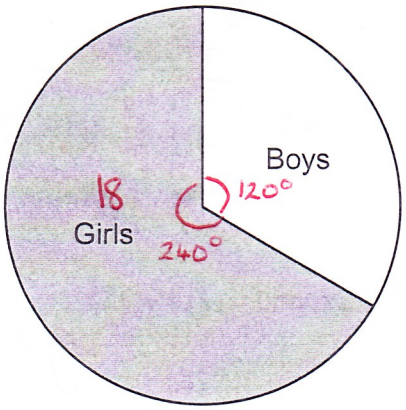
$8\ cm = x$

Examine only

17. The pie charts show the proportion of boys to girls in class A and class B.



Class A



Class B

(1) There are more pupils in class B than in class A.

(2) There are 4 boys in class A.

(3) There are $1\frac{1}{2}$ times as many girls in class B than in class A.

How many boys are there in class B? [4]

(2) tells us 4 boys in class A so 3x4 = 12 girls in class

(3) tells us $1\frac{1}{2}$ x as many girls in B than A

$= 1\frac{1}{2} \times 12$

= 18 girls in class B

Girls = 240° in class B

Boys = 120° in class B

∴ 18 ÷ 2 = 9 boys in class B.

18. *(a)* Solve $\frac{x}{2} + 18 = 26$. [2]

$\frac{x}{2} = 26 - 18$

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

$\times 2$ $x = 8 \times 2$

$x = 16$

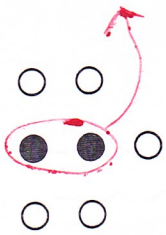
(b) Expand $y(y^2 + 4)$. [2]

$y^3 + 4y$

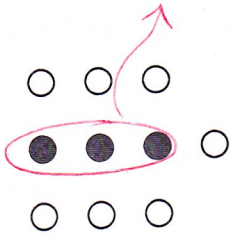
19. Patterns made with black and white circles are shown below.

Pattern 1

Pattern 2



Pattern 3



Complete the following statements, in terms of n. [3]

'There will be ..... n ..... black circles in Pattern n.'

'There will be ..... $2n + 1$ ..... white circles in Pattern n.'

Examiner only

20. In the diagram, angles a, b and c are measured in degrees.

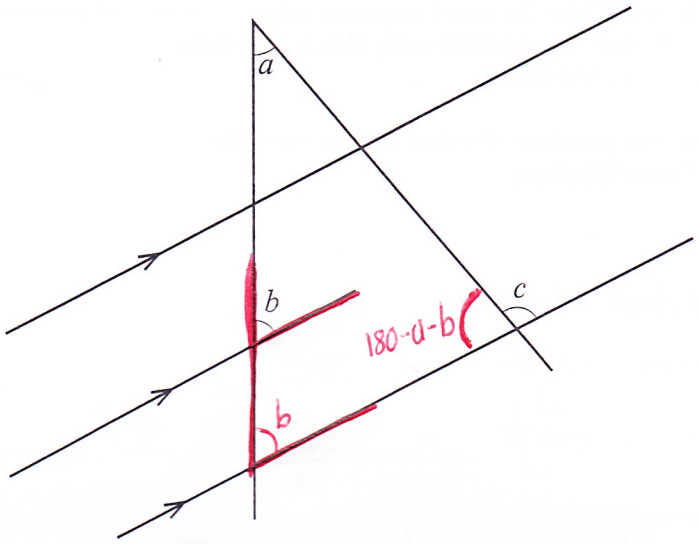


Diagram not drawn to scale

Find the size of angle c in terms of a and b.
You must show all your working, which may be indicated on the diagram. [3]

For big triangle Missing angle = 180 - a - b

This means that c = a + b

21. Maggie has lots of tiles.
All of her tiles are in the shape of regular polygons.
The edges of all the tiles have the same length.

She places two 12-sided tiles to meet edge-to-edge.
Maggie places a different-shaped tile with these two tiles.
She finds that the 3 tiles tessellate.

By calculation, find the number of sides of this third tile. [5]
You must show all your working.

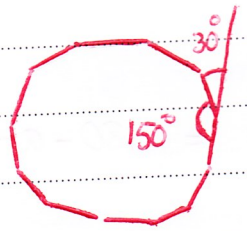
For 12 sided tiles

12 exterior angles = 360°

1 exterior angle = $\frac{360}{12}$ = 30°

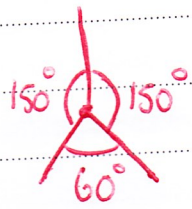
Each interior angle = 180 − 30

= 150°



2 12 sided shapes together = 2 × 150

= 300°



∴ Missing angle = 60° (150 + 150 + 60 = 360°)

60° is angle of equilateral △.

∴ Missing tile has 3 sides.

END OF PAPER