Surname	Centre Number	Candidate Number
Other Names		0

WJEC CBAC

GCSE

4370/03

SOLUTIONS

MATHEMATICS – LINEAR
PAPER 1
FOUNDATION TIER

A.M. TUESDAY, 11 June 2013

$1\frac{3}{4}$ hours

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 **15**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	11	
2	8	
3	4	
4	7	
5	6	
6	3	
7	3	
8	8	
9	4	
10	4	
11	8	
12	3	
13	5	
14	7	
15	9	
16	4	
17	6	
TOTAL MARK		

4370 030001

Examiner only

1. *(a)* (i) Write down, in figures, the number thirty two thousand and fifty six. [1]

32,056

(ii) Write down, in words, the number 10 102. [1]

Ten thousand, one hundred and two

(b) Using only the numbers in the following list,

44 48 13 12 36 23 41

write down

(i) two numbers that have a sum of 67, [1]

44 and 23

(ii) two numbers that have a difference of 29, [1]

41 and 12

(iii) a square number. [1]

36 $(6^2 = 36)$

(c) Write 6518

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

6520

(ii) correct to the nearest 1000. [1]

7000

(d) Write down all the factors of 18. [2]

1, 18, 2, 9, 3, 6

(e) Each of the digits 6, 1, 3 and 4 is used once to make a four-digit number.

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

1346

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

6314

4370 030003

Examiner only

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

(i) 35, $\xrightarrow{-6}$ 29, $\xrightarrow{-6}$ 23, $\xrightarrow{-6}$ 17, $\xrightarrow{-6}$ 11

(ii) 12, $\xrightarrow{+4}$ 16, $\xrightarrow{+5}$ 21, $\xrightarrow{+6}$ 27, $\xrightarrow{+7}$ 34

[2]

(b) What is the value of the 8 in the number 78 431?

8000

[1]

(c) Write $\frac{3}{4}$ as a decimal 0·75

Write 77% as a decimal 0·77

Write $\frac{3}{4}$, 77% and 0·73 in ascending order.

0·73, $\frac{3}{4}$, 77%

[3]

(d) Showing all your working, find an **estimate** for the value of 98·6 × 19·2.

$\approx$ 100 × 20

$\approx$ 2000

[2]

Examiner only

3. The formula for finding the value of any term in a sequence is

value of the term = 7 × number of the term + 4

(a) Find the **value of the term** when the **number of the term** is 9.

value = (7 × 9) + 4

= 63 + 4

= 67

[2]

(b) Find the **number of the term** when the **value of the term** is 88.

88 = 7 × number of term + 4

88 − 4 = 7 × number of term

84 = 7 × number of term

÷7 $\frac{84}{7}$ = number of term

12 = number of term

[2]

4370 030005

Examiner only

4. Fifty pupils were asked to choose one sport from Rugby (R), Soccer (S), Hockey (H) or Tennis (T).
Here are the results of the survey.

R	H	R	H	T	S	S	R	H	S
T	R	H	R	S	R	T	H	T	H
S	T	R	S	H	T	R	H	R	H
H	R	S	R	H	S	T	S	R	S
R	S	H	R	T	R	H	H	R	S

(a) Using the centimetre squared grid on the opposite page, draw a bar chart for the data given.

R 𝍸 𝍸 𝍸 I 16

S 𝍸 I 𝍸 II 12

H 𝍸 𝍸 IIII 14

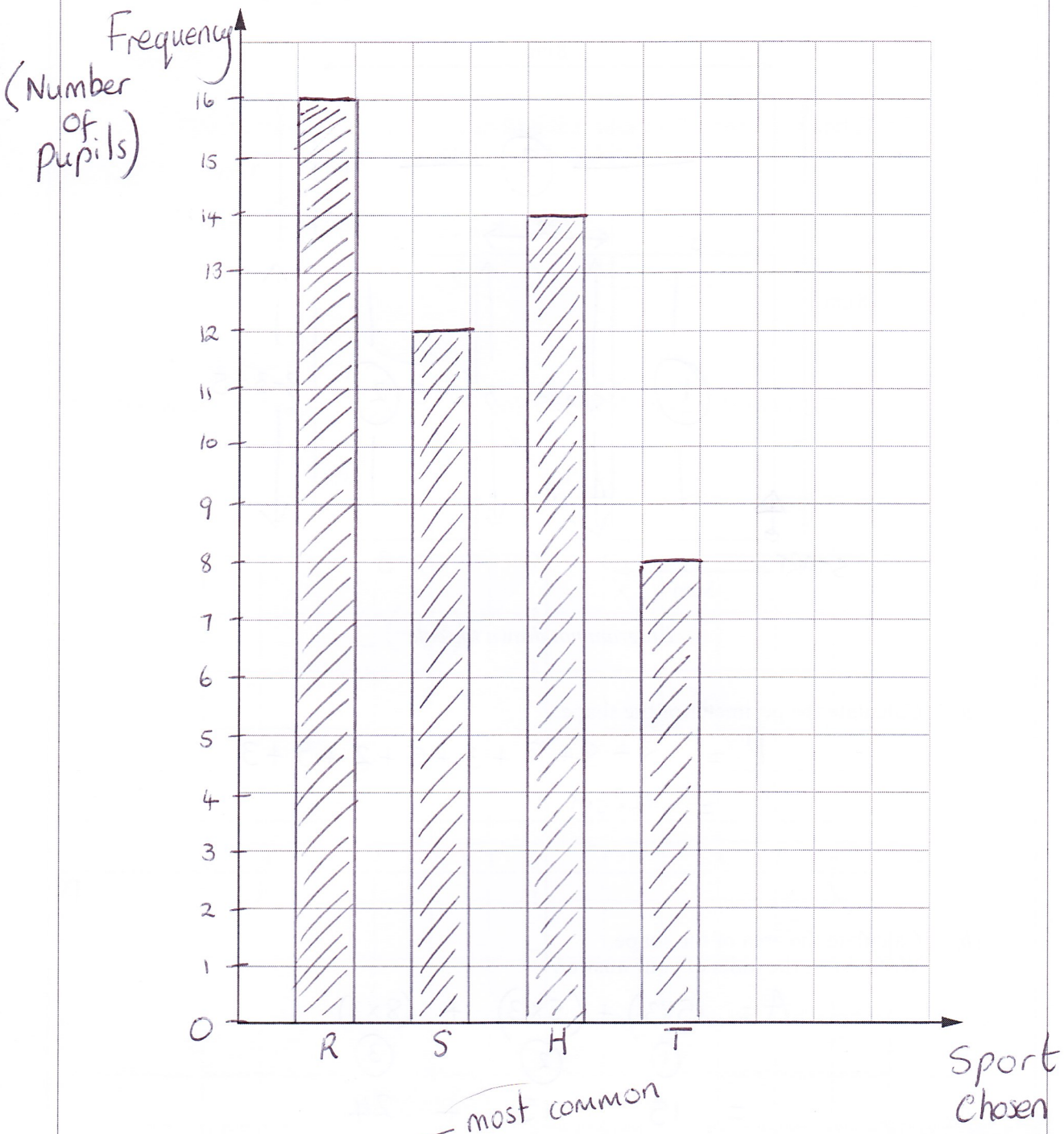
T 𝍸 III 8

TOTAL 50

[6]

Examiner only

For use with question 4



most common

(b) Write down the mode.

Rugby

[1]

Examiner only

5. Three overlapping rectangles, each 8 cm by 3 cm, are placed so as to make the shape shown in the diagram.

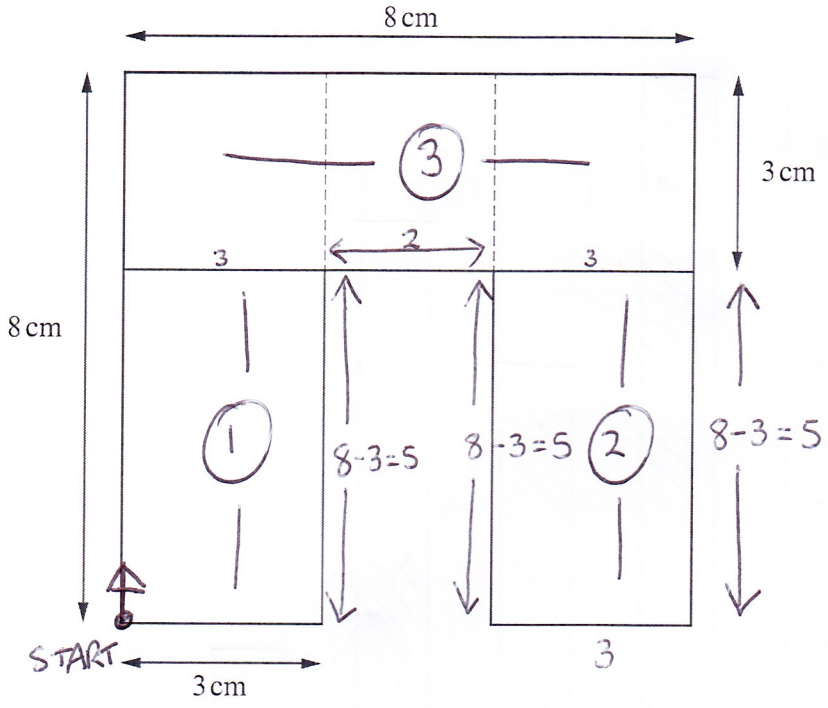


Diagram not drawn to scale

(a) Calculate the perimeter of the shape.

$P = 8+8+8+3+5+2+5+3$

$= 42\text{cm}$

[3]

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

$A = (5\times3) + (5\times3) + (8\times3)$

① ② ③

$= 15 + 15 + 24$

$= 54\ \text{cm}^2$

[3]

Examiner only

6. *(a)* Simplify $3x + 4x - x$.

$= 6x$

[1]

(b) Use the formula $P = 6T + 4H$ to find the value of P when $T = 5$ and $H = 9$.

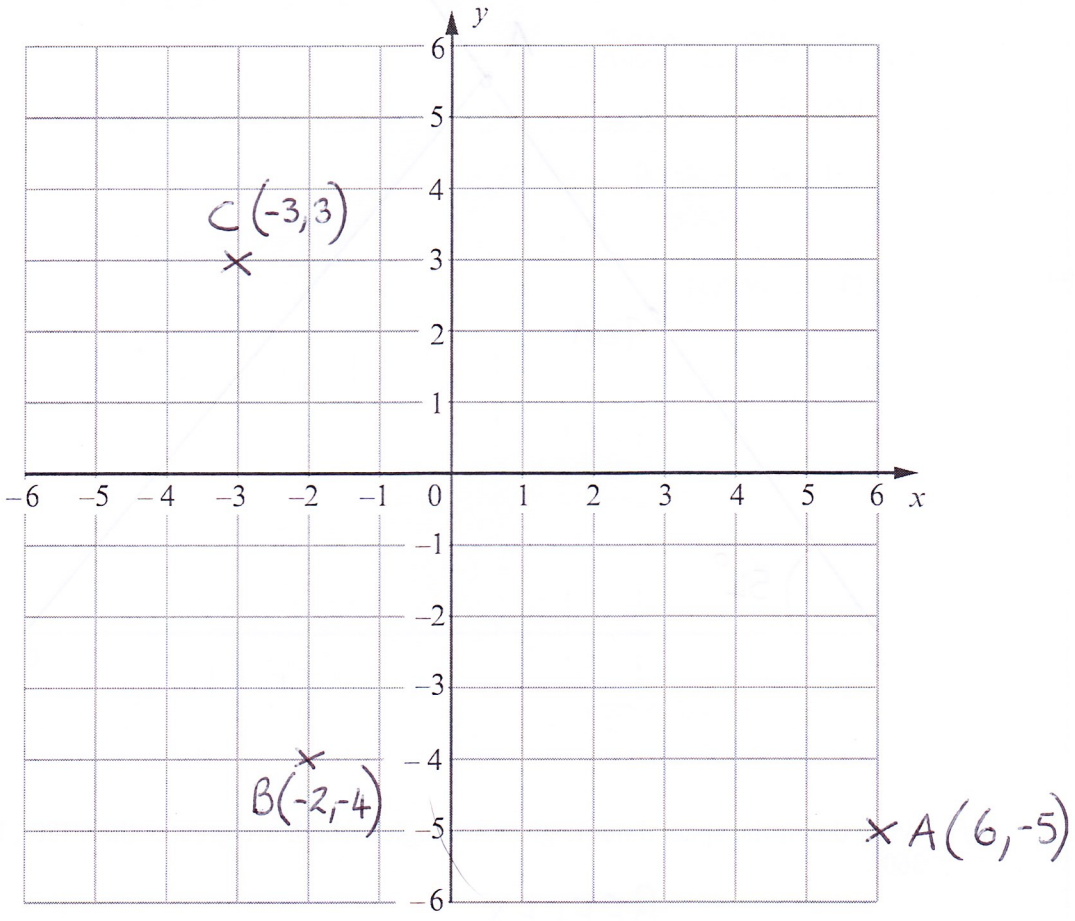
$P = 6(5) + 4(9)$

$P = 30 + 36$

$P = 66$

[2]

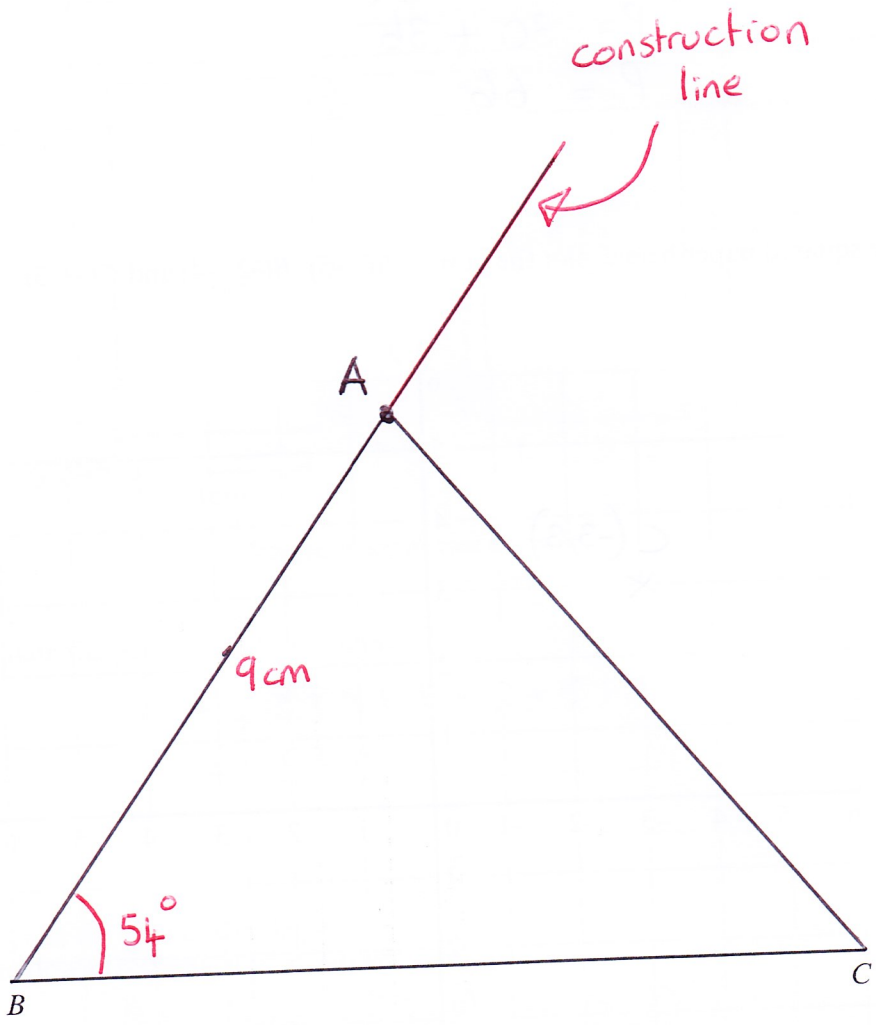
7. On the squared paper below, plot the points $A(6, -5)$, $B(-2, -4)$ and $C(-3, 3)$.



[3]

Examiner only

8. *(a)* Complete an accurate drawing of triangle ABC, in which $BC = 12\,\text{cm}$, $A\hat{B}C = 54°$ and $BA = 9\,\text{cm}$.
The side BC has been drawn for you.



[3]

(b) Write down the special name given to angles which are greater than 180°, but less than 360°.

REFLEX

[1]

Examiner only

(c) Two litres of water are poured into an empty rectangular tank of length 25 cm and width 20 cm.
The water completely fills the tank, without it overflowing.
Calculate the depth of the tank.

2 litres
= 2000 ml
= 2000 cm^3

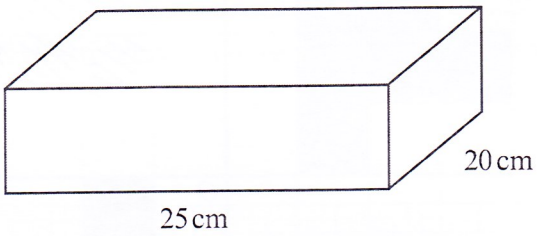


Diagram not drawn to scale

Volume of a cuboid $V = lbh$

$2000 = 25 \times 20 \times h$

An Equation $\longrightarrow$ $2000 = 500h$

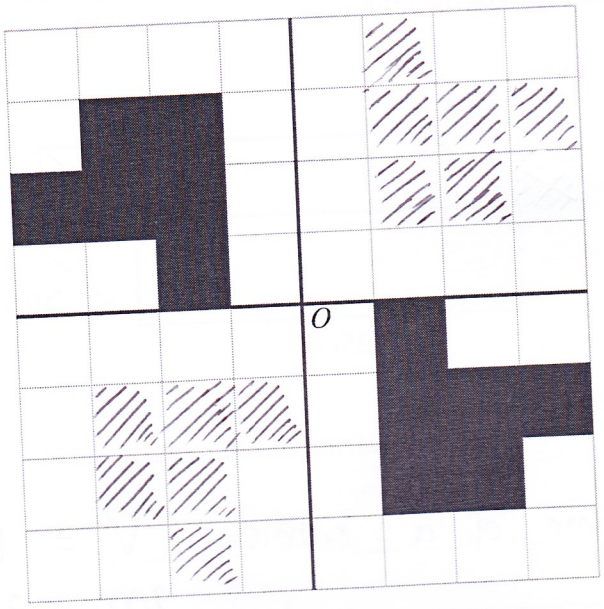
$\frac{2000}{500} = h$

$4cm = h$ [4]

4370 030011

Examiner only

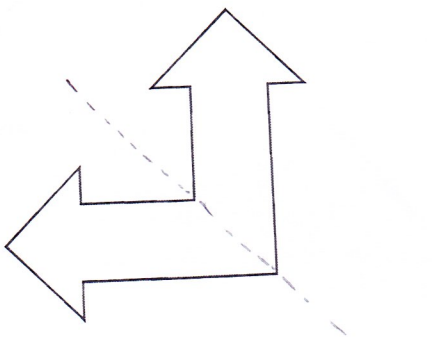
9. *(a)* Draw two more shapes so that the completed pattern has rotational symmetry of order 4 about O.



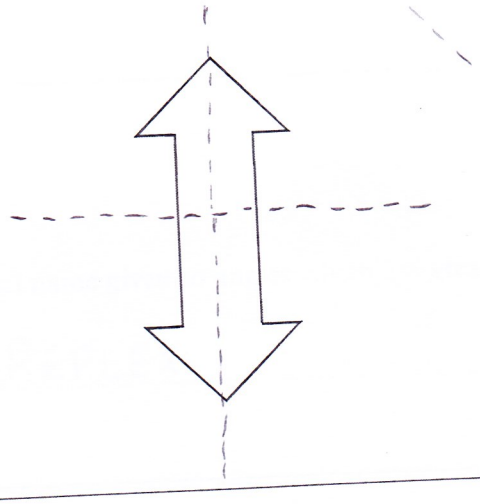
[2]

(b) Draw all the lines of symmetry on the following two diagrams.

(i)



(ii)



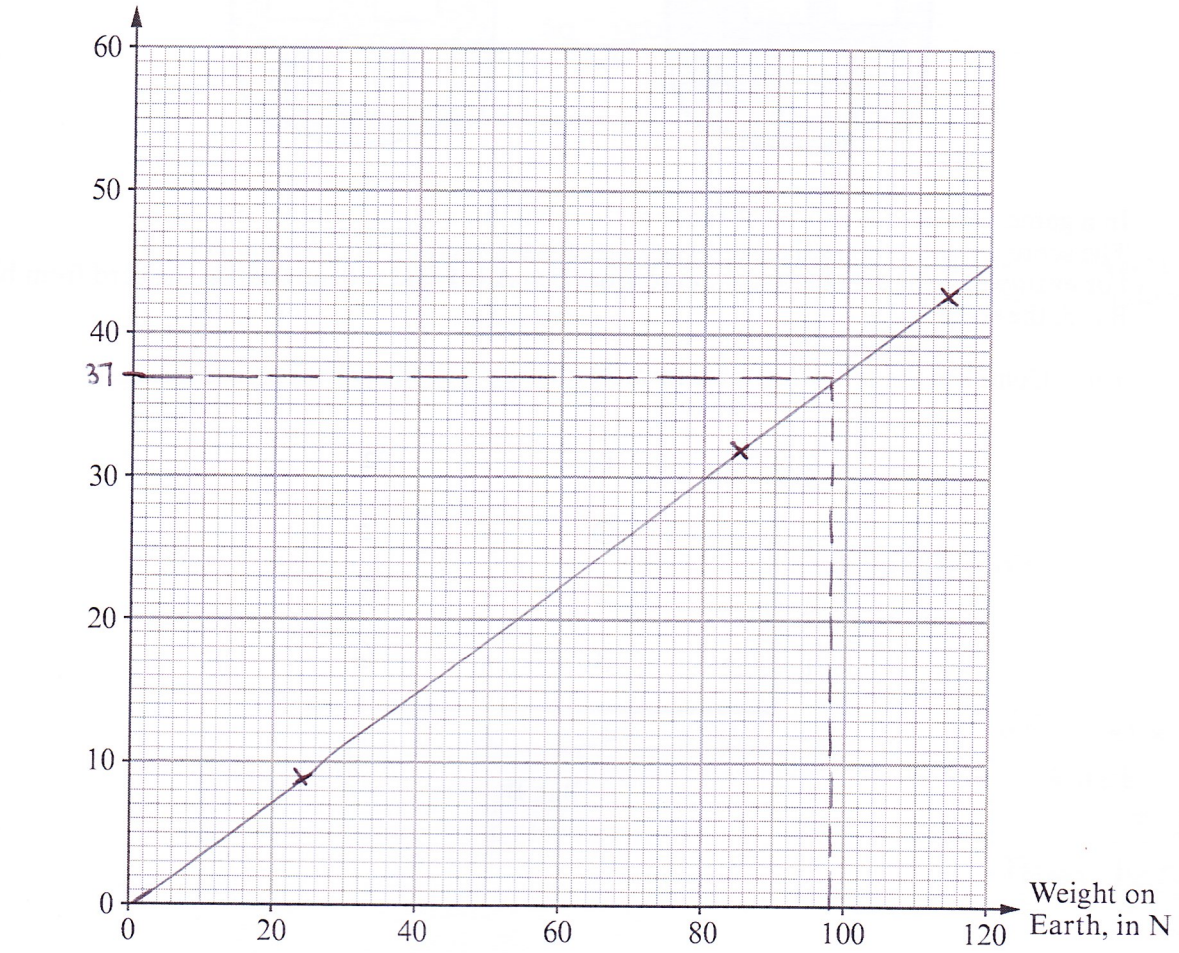
[2]

Examiner only

10. *(a)* The weight of an object on the planet Mars is different from the object's weight on Earth. The table shows the weight in newtons (N) of three different objects on Earth and on Mars.

Weight on Earth (N)	114	85	24
Weight on Mars (N)	43	32	9

Use the data in the table to draw a conversion graph between weights on Earth and weights on Mars.



[2]

(b) A rock weighs 370 N on Mars.
Find an estimate for the weight of this rock on Earth.

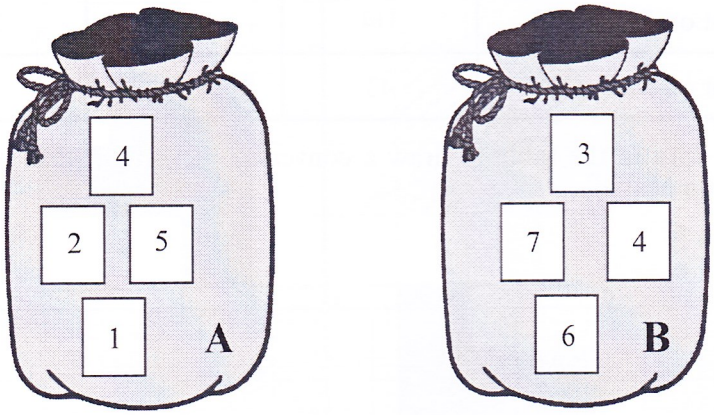
37N = 98N
MARS EARTH

370N = 980N
Mars Earth

[2]

Examiner only

11. In bag A, there are four cards numbered 1, 2, 4 and 5 respectively. In bag B, there are four cards numbered 3, 4, 6 and 7 respectively.



In a game, one card is chosen at random from bag A and one from bag B.
The score for the game is the positive difference between these two numbers.
For example, if the number on the card from bag A is 1 and the number on the card from bag B is 3, the score is 3 – 1 = 2.

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

Bag A \ Bag B	3	4	6	7
5	2	1	1	2
4	1	0	2	3
2	1	2	4	5
1	2	3	5	6

[2]

Examiner only

(b) A player wins a prize by getting a score of 2 or less.

(i) What is the probability of a player winning a prize?

10 scores of 2 or less in the table

$P(\text{winning}) = \frac{10}{16} = \frac{5}{8}$ [2]

(ii) 80 people each play the game once.
Approximately how many would you expect to win a prize?

$\frac{5}{8} = \frac{50}{80}$ so you would expect 50 winners

[2]

(iii) It costs 90p to play the game once. The prize for getting a score of 2 or less is £1.20. If the 80 people each play the game once, approximately how much profit do you expect the game to make?

Takings = 80 × 90p
= 7200p = £72

Pay Outs to winners = 50 × £1·20
= £60

↖ do 100 × 1·20 first
= 120
Then halfofit !!

Profit = 72 − 60
= £12

[2]

Examiner only

12. A bucket when full of water weighs 18 kg.
Half of the water is poured away.
The bucket and water now weigh 11 kg.
What is the weight of the empty bucket?

Bucket + water = 18

B + w = 18

B + $\frac{1}{2}$w = 11

So $\frac{1}{2}$w = 7

×2 w = 7 × 2

w = 14 kg

[3]

∴ Bucket weighs 4 kg

Examiner only

13. *(a)* Find the size of angle x.

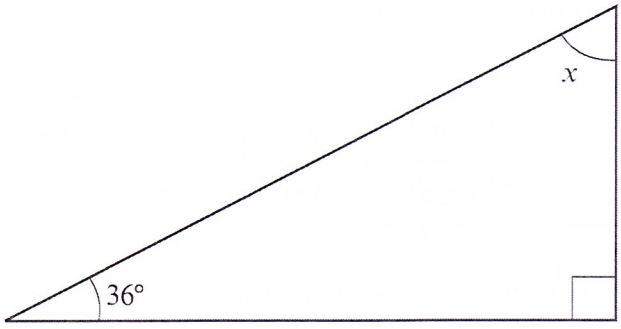


Diagram not drawn to scale

180 - 36 - 90

$x =$ 54 °

[2]

(b) Find the size of angle y.

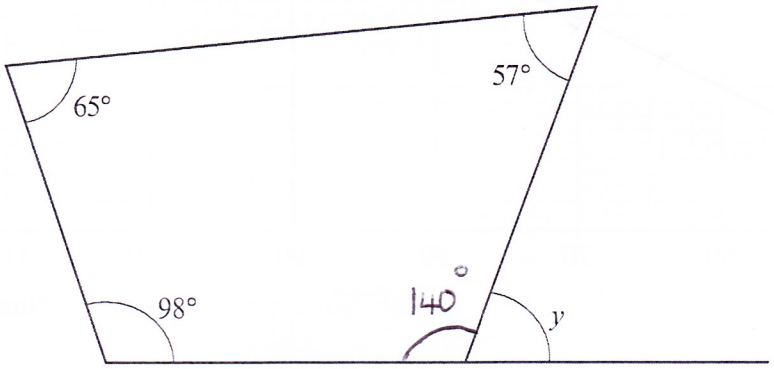


Diagram not drawn to scale

Angles in a quad add up to 360°

360 - 65 - 98 - 57 = 140°

Angle of straight line add up to 180°

y = 180 - 140

$y =$ 40 °

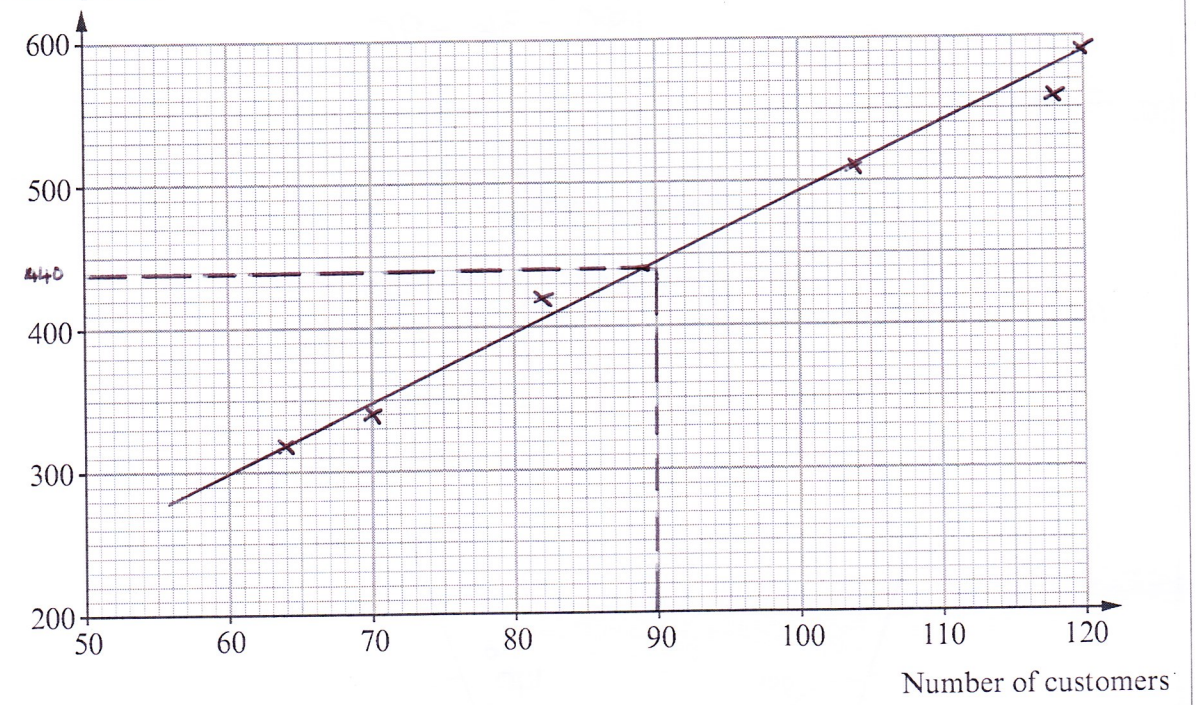
[3]

Examiner only

14. Every Friday for 6 weeks, the number of customers entering a sandwich shop and the takings of the shop were recorded.
The takings were recorded correct to the nearest £10.
The table below shows the results.

Number of customers	104	82	120	64	70	118
Takings, in £	510	420	590	320	340	560

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



[2]

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

POSITIVE

.....

[1]

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

[1]

(d) Estimate the takings for a Friday when there are 90 customers.

£ 440

.....

[1]

Examiner only

(e) Approximately how much does a customer spend, on average, in the sandwich shop on a Friday?

The takings figure is approximately 5x the customer number figure.
∴ Each customer spends about £5

[2]

Examiner only

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

Pedro has just moved to live on an island in Europe.
There is a choice of two different water companies.

Manana Water	**Channel Water**
No Standing Charge	Standing Charge: €30 every 3 months + €0.02 per m^3 of water used
Pay €0.06 per m^3 of water used	*Special offer*: 20% off your **first** bill

Pedro estimates that he uses 700 m^3 of water every three months.
He wants to spend as little as possible on water.
Which company should Pedro buy his water from?
You must justify your answer by showing all possible costs.

Manana for 3 months

Cost = 700 x 0·06
= 7 x 6
= £42

Channel for 3 months

Cost = 30 + 700 x 0·02
= 30 + 14
= £44

For 1st bill Reduction = 20% of 44
10% = £4·40
20% = £8·80

Generally Manana is £2 cheaper for 3 months.

BUT Channel Special offer means it is £8·80 cheaper for 1st 3 months.

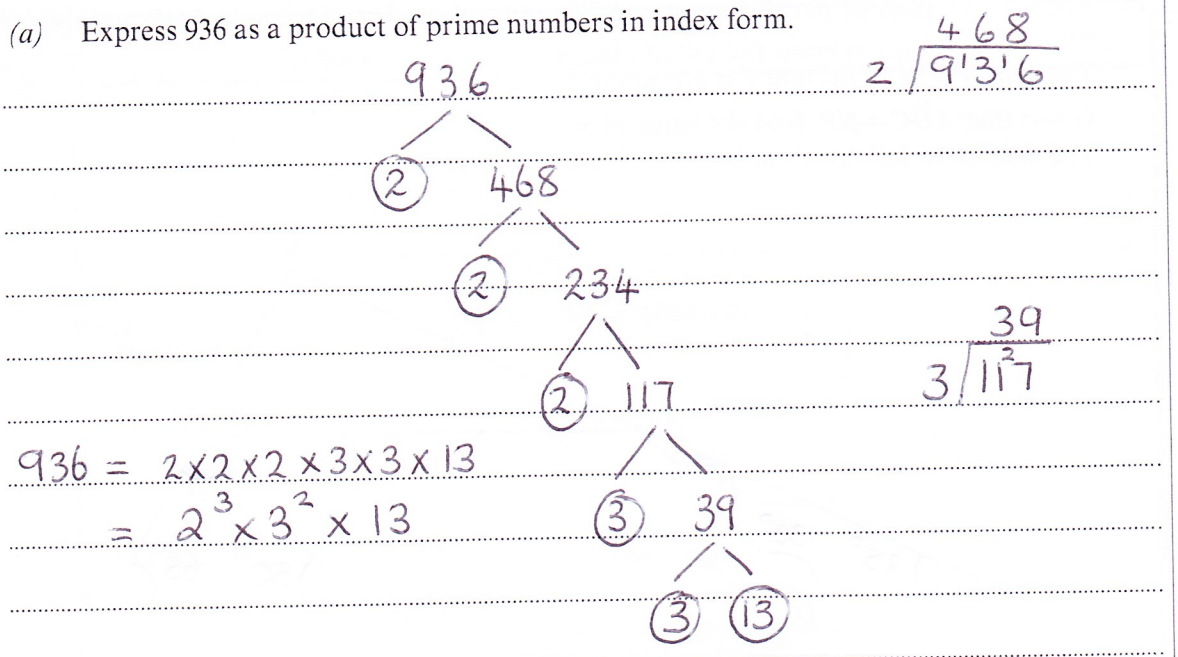
For the 1st four bills ~~£~~ (1 year) it will be cheaper to have used Channel.
Manana 4x2 = £8
Channel £8·80

After the 1st four bills the saving will be greater with Manana
Manana = 5x2 = £10 cheaper
Channel = £8·80

[9]

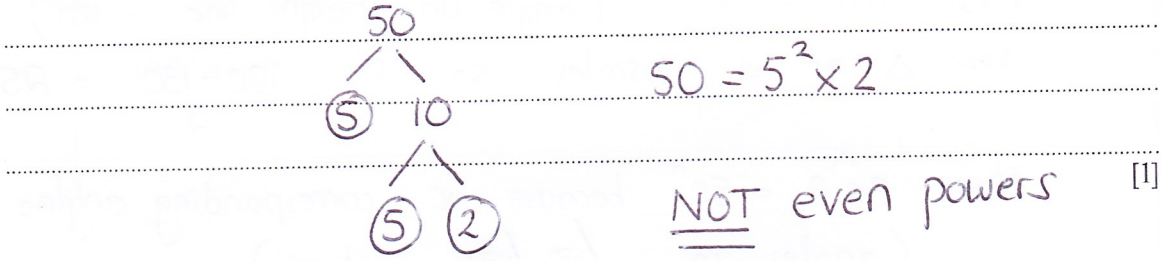
Examiner only

16. *(a)* Express 936 as a product of prime numbers in index form.



[3]

(b) Explain why 50 is not a perfect square number.



[1]

Examiner only

17. The four vertices of parallelogram $ABCD$ lie on the sides of triangle PQR as shown in the diagram.
The sides PD, AD, BC and CR are equal.
Given that $A\hat{D}C = 50°$, find the value of x.
You must show full details of how you obtained your answer.

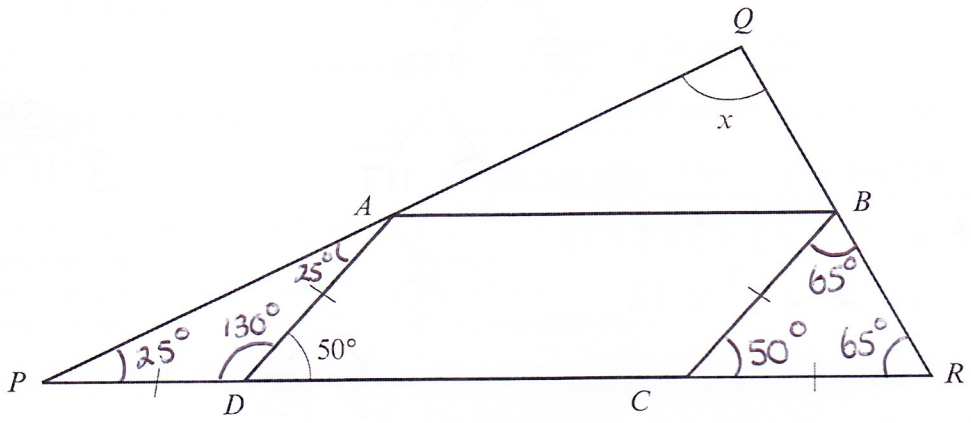


Diagram not drawn to scale

First $A\hat{D}P = 130°$ (angle on straight line = 180°)

Now $\triangle ADP$ is isosceles so $\hat{P} = \frac{180-130}{2} = 25°$

Now $B\hat{C}R = 50°$ because of corresponding angles (angles in 50 50 shape)

$\triangle BCR$ is also isosceles

$\hat{R} = \frac{180-50}{2} = 65°$

NOW Use large $\triangle PQR$. We know $\hat{P} = 25°$ $\hat{R} = 65°$ [6]

$\therefore \hat{Q} = 180 - 25 - 65$ (angles in a triangle add up to 180°)

$\hat{Q} = 90°$

$\therefore x = 90°$