Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE

General Certificate of Secondary Education

WJEC CBAC

CYD-BWYLLGOR ADDYSG CYMRU

Tystysgrif Gyffredinol Addysg Uwchradd

SOLUTIONS

185/02

MATHEMATICS

PILOT EXAMINATION

FOUNDATION TIER PAPER 2

A.M. MONDAY, 11 June 2007

(2 Hours)

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	4	
2	5	
3	6	
4	4	
5	5	
6	3	
7	2	
8	5	
9	6	
10	12	
11	7	
12	3	
13	4	
14	4	
15	3	
16	8	
17	10	
18	5	
19	4	
TOTAL MARK		

ADDITIONAL MATERIALS

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

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.

Take π as 3·14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

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

Unless stated, diagrams are not drawn to scale.

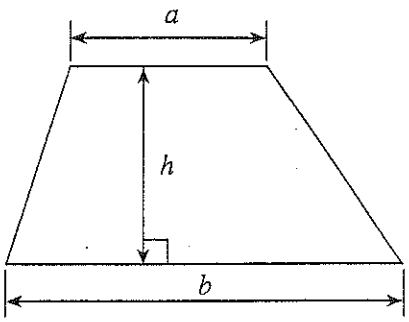
Scale drawing solutions will not be acceptable where you are asked to calculate.

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

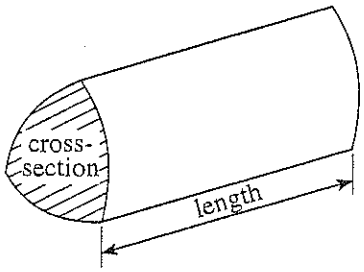
No certificate will be awarded to a candidate detected in any unfair practice during the examination.

Formula List

Area of trapezium = $\frac{1}{2}(a + b)h$



Volume of prism = area of cross-section × length



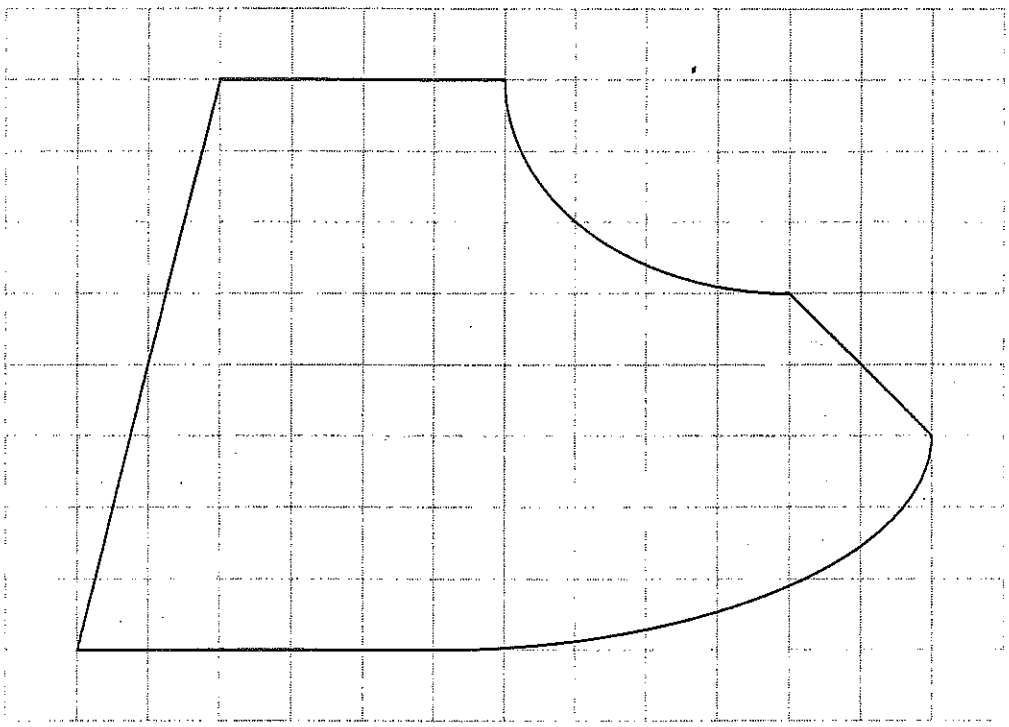
1. Tom decides to buy new plants for his garden from the local garden centre.

   Complete the following bill for the items he buys. [4]

ITEM	COST
4 rose bushes at £6.74 each	£ 26.96
24 hedging plants at £2.74 each	£ 65·76
6 azaleas at £6.82 each	£ 40·92
5 bags of peat at £3.75 a bag	£ 18·75
1 bag of fertiliser at £3.61	£ 3.61
TOTAL	£ 156·00

4

2. *(a)*



By counting squares, estimate the area of the above figure, which is drawn on a centimetre square grid. [2]

Area = 62 cm^2

(b) Which **metric unit** is best used to measure

(i) the weight of a car, tonne

(ii) the volume of a container of milk, litre (cl)

(iii) the distance between Llandrindod Wells and Wrexham? km

[3]

3. *(a)* Write in figures the number eleven thousand seven hundred and fifty three.

11,753

[1]

(b) Andrew buys a CD for £6.25 and a DVD for £11.56.
He pays with a £20 note.
How much change should Andrew be given?

£2·19

[2]

(c) Megan is given £50 for her birthday.
She uses the money to buy three pairs of shoes.
Each pair of shoes costs £14.89.
How much of the £50 will be left?

50 − 44·67

= £5·33

[2]

(d)

GOOD FIT SHOES
SALE
All prices reduced by 50%

WELL MADE SHOES
SALE
All prices reduced by $\frac{1}{4}$

Sam says that in the shoe sale 'WELL MADE SHOES' have reduced their prices more than 'GOOD FIT SHOES'.
Explain why Sam is wrong.

$\frac{1}{4}$ = 0·25 = 25%.

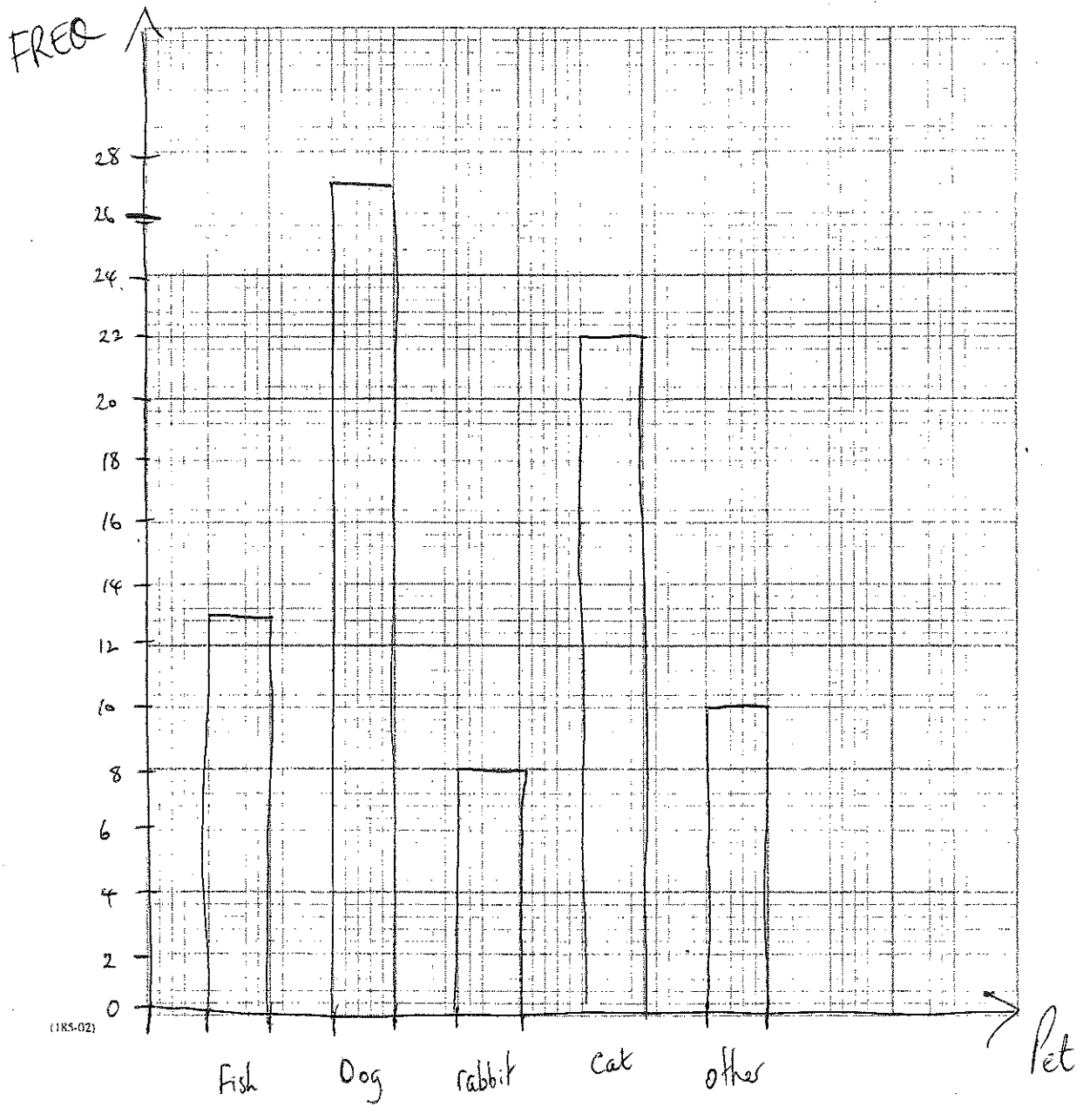
∴ Good fit bigger % reduction

[1]

4. Gary carries out a survey to find the most popular type of pet.
The results of his survey are shown in the following table.

Type of pet	Tally	Frequency
Fish	𝍸 𝍸 ///	13
Dog	𝍸 𝍸 𝍸 𝍸 𝍸 //	27
Rabbit	𝍸 ///	8
Cat	𝍸 𝍸 𝍸 𝍸 //	22
Other	𝍸 𝍸	10

Complete the frequency column in the above table and use this data to draw a suitable bar chart on the graph paper below. [4]



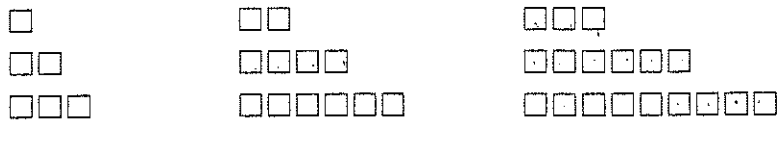
5. *(a)* Write down the next term in **each** of the following sequences.

(i) 5, 11, 17, 23, 29

(ii) 56, 49, 42, 35, 28

[2]

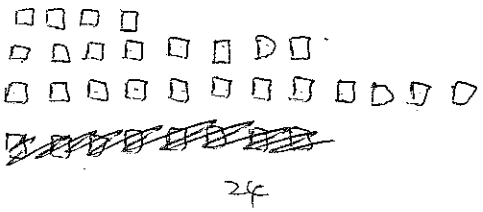
(b) The symbol □ is used to form a pattern.
The first three patterns are shown below.



Pattern 1 Pattern 2 Pattern 3

6 12 18

(i) Draw a diagram showing the fourth pattern.



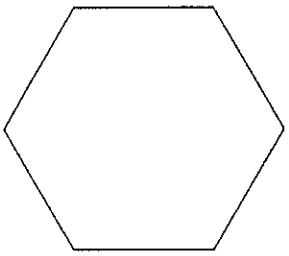
24

(ii) Without drawing the pattern, calculate the number of □ symbols that would be needed to draw the fifth pattern.

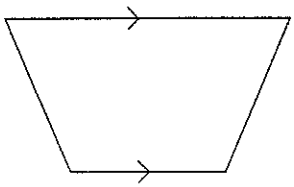
30

[3]

6. *(a)* Name **each** of the following shapes. [2]

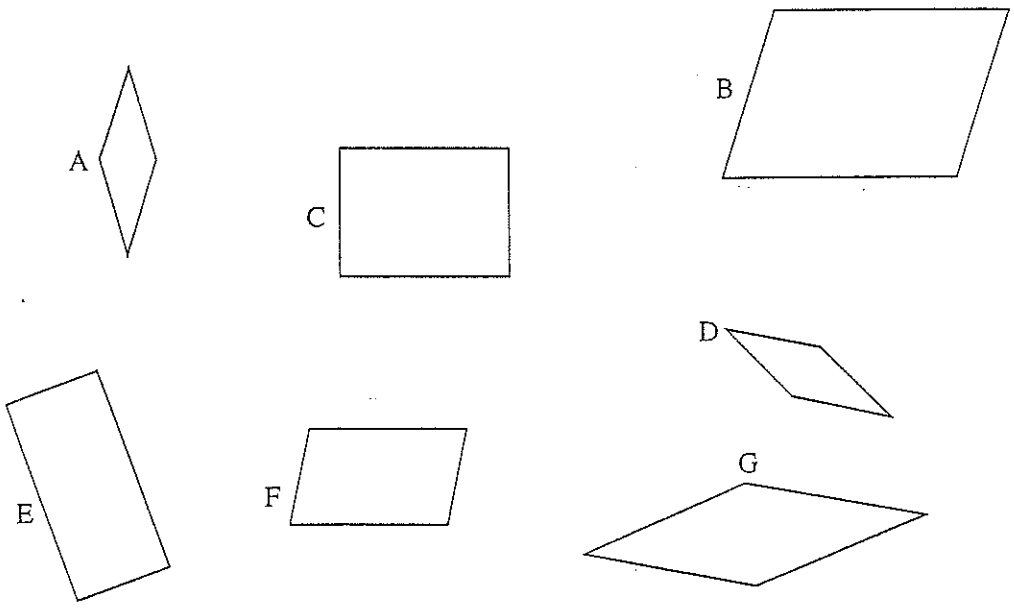


HEXAGON



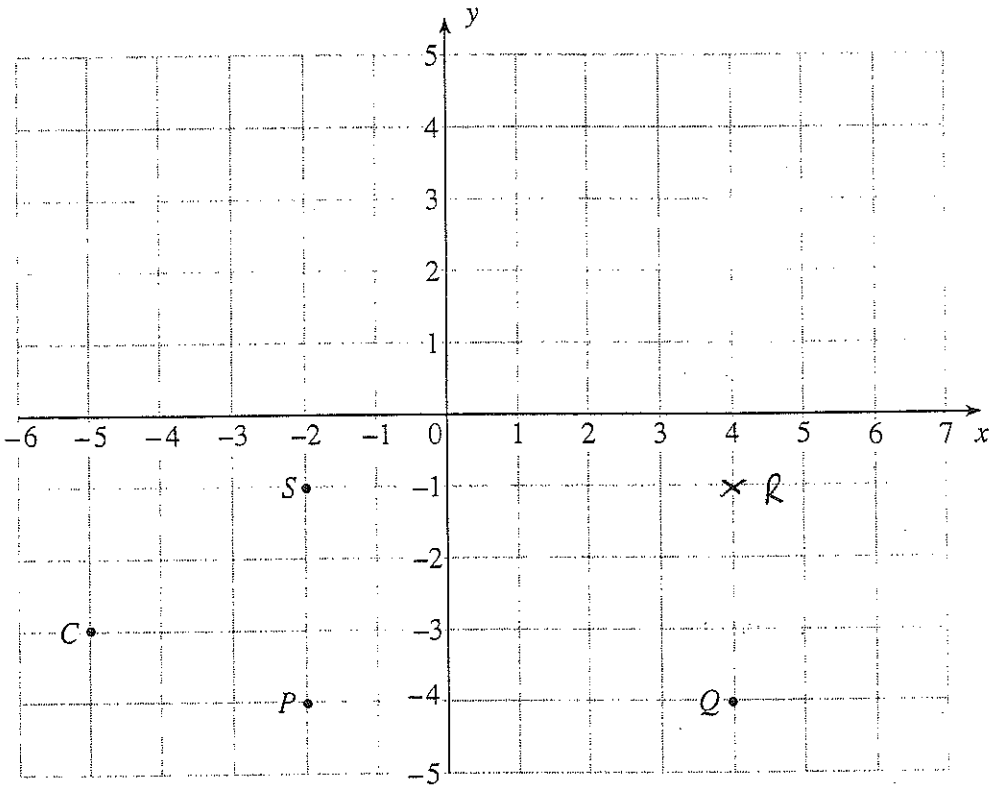
TRAPEZIUM

(b) Which two of the following shapes are congruent to each other?



The congruent shapes are A + D [1]

7.



(a) Write down the coordinates of the point *C*.

Coordinates of *C* are (-5 , -3)

[1]

(b) Write down the coordinates of the point *R* which would make *PQRS* a **rectangle**.

Coordinates of *R* are (4 , -1)

[1]

8. *(a)* Solve **each** of the following equations.

(i) $4x = 28$

$x = 7$

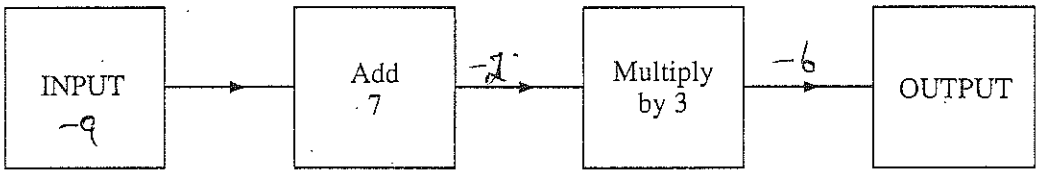
(ii) $x + 8 = 19$

$x = 19 - 8$

$x = 11$

[2]

(b) The diagram below represents a number machine.



Find the OUTPUT when the INPUT is –9.

OUTPUT = -6 [1]

(c) Given that $W = 4H + 6D$, find the value of W when $H = 3$ and $D = 4$.

$W = 4(3) + 6(4)$

$= 12 + 24$

$= 36$

[2]

9. *(a)* Alex played cricket for his school. The runs he scored in matches in the 2006 cricket season are shown below.

34, 46, 23, 1, 56, 45, 67, 3, 92, 55, 29

(i) Write down the range of these scores.

92 - 1 = 91

(ii) Calculate his mean score for the season.

$\frac{34+46+23+1+56+45+67+3+92+55+29}{11}$

$= \frac{451}{11} = 41$

[4]

(b) Find the median of the following numbers.

~~21~~, ~~22~~, ~~24~~, ~~21~~, 32, ~~27~~, ~~28~~, ~~27~~, ~~26~~

21, 21, 22, 24, 26, 27, 27, 28, 32

26

[2]

10. *(a)* A shopkeeper has a box containing 750 screws.
He decides to sell them in small bags, each bag containing 36 screws.
How many bags can he fill and how many screws will be left over?

$750 \div 36 = 20.8\dot{3}$

$20 \times 36 = 720$

Number of bags ..20..

Number of screws left over ..30..

[2]

(b) Mathew hires a high-pressure water jet to clean his drive and garden patio.
The cost of hiring the jet is £25.55 plus a daily charge of £5.75.
How much would Andrew pay if he hired the water jet for 4 days?

$25.55 + (4 \times 5.75)$

$25.55 + 23$

$= £48.55$

[2]

(c) In 2006 Simon earned £24 500.
His salary increased by 14% in 2007.
Calculate the increase in Simon's salary in 2007.

$1\% = £245$

$14\% = 14 \times 245 = £3430$

[2]

(d) Write down the value of

(i) $4{\cdot}1^2$,

16·81

(ii) $\sqrt{92{\cdot}16}$.

9·6

[2]

(e) Write 2·340756

(i) correct to the nearest whole number,

2

(ii) correct to 4 decimal places.

2·3408

[2]

(f) Find the value of $3 \cdot 2^2 - \sqrt{31 \cdot 36}$ giving your answer correct to 1 decimal place.

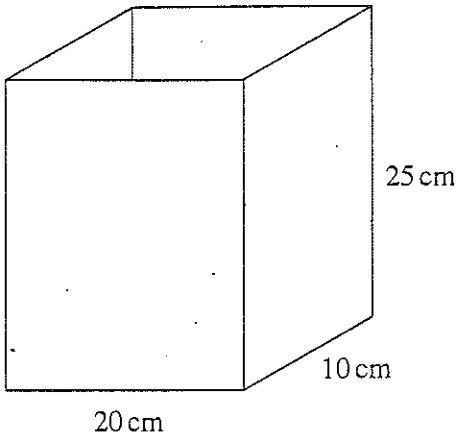
$10 \cdot 24 - 5 \cdot 6$

$= 4 \cdot 64$

[2]

$= 4 \cdot 6$

11.



(a) A storage container, in the shape of a cuboid, measures 20 cm by 10 cm by 25 cm. Calculate the volume of the container, clearly indicating the units of your answer.

$20 \times 10 \times 25$

$= 5000\ cm^3$

[3]

(b) The container is used to store 4 litres of cooking oil.
Calculate the distance of the surface of the cooking oil below the top of the container.

$V = lbh$

$4000 = 20 \times 10 \times h$

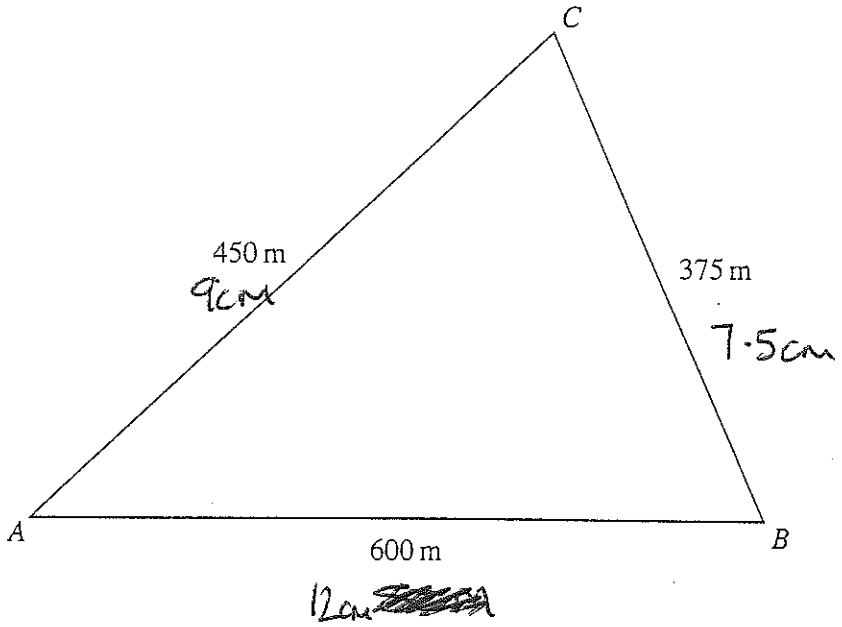
$\frac{4000}{200} = h$

[4]

$20cm = h.$

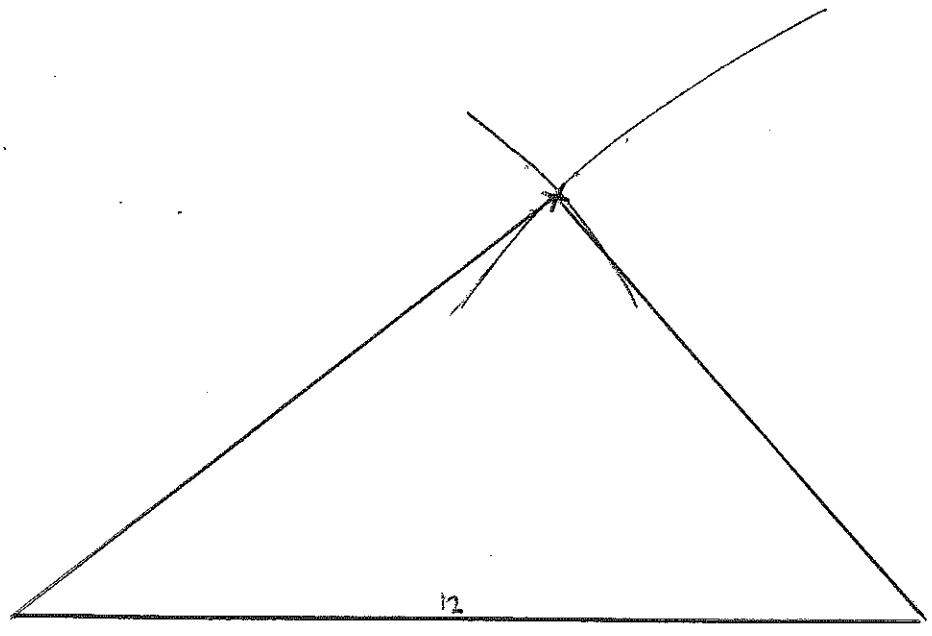
$\therefore$ 5cm below top.

12.



The above diagram shows a triangular field ABC in which AB = 600 m, BC = 375 m and CA = 450 m.

Using a scale of 1 cm to represent 50 m, make an accurate scale drawing of the field. [3]



13. Simon buys 18 bags of sand and 6 bags of cement.
The total cost of the sand and cement is £63.
The cost of a bag of sand is £2.25.
Calculate the cost of one bag of cement.

Sand $18 \times 2.25 = £40.50$

$63 - 40.50 = £22.50$

$\therefore$ 1 bag cement $= \frac{22.50}{6} = £3.75$ [4]

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14. *(a)* Find the size of the angle marked y in the following diagram.

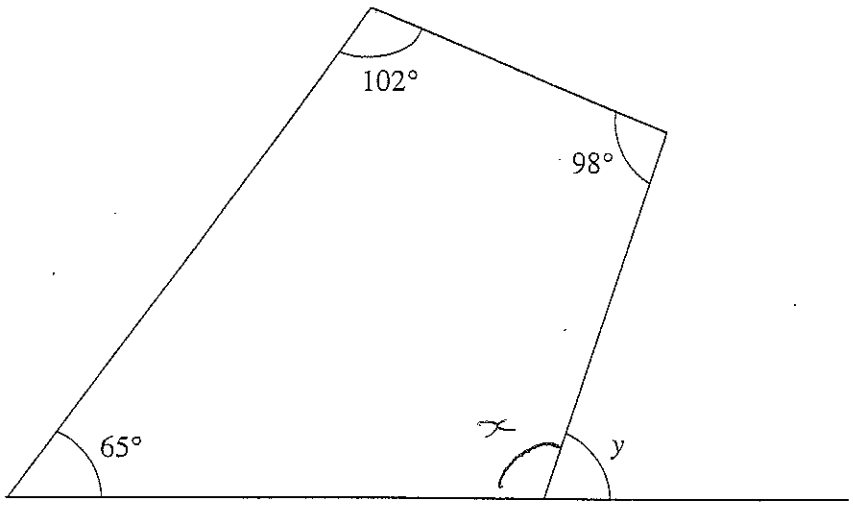


Diagram not drawn to scale.

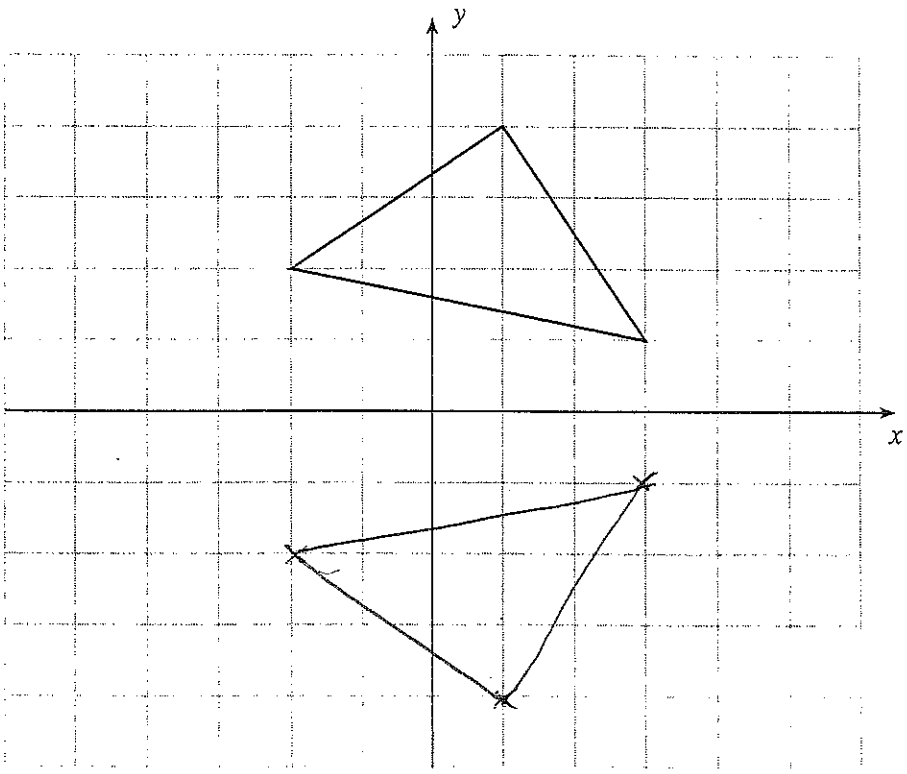
$x = 360 - 65 - 102 - 98$

$x = 95°$

$y = 85°$

[3]

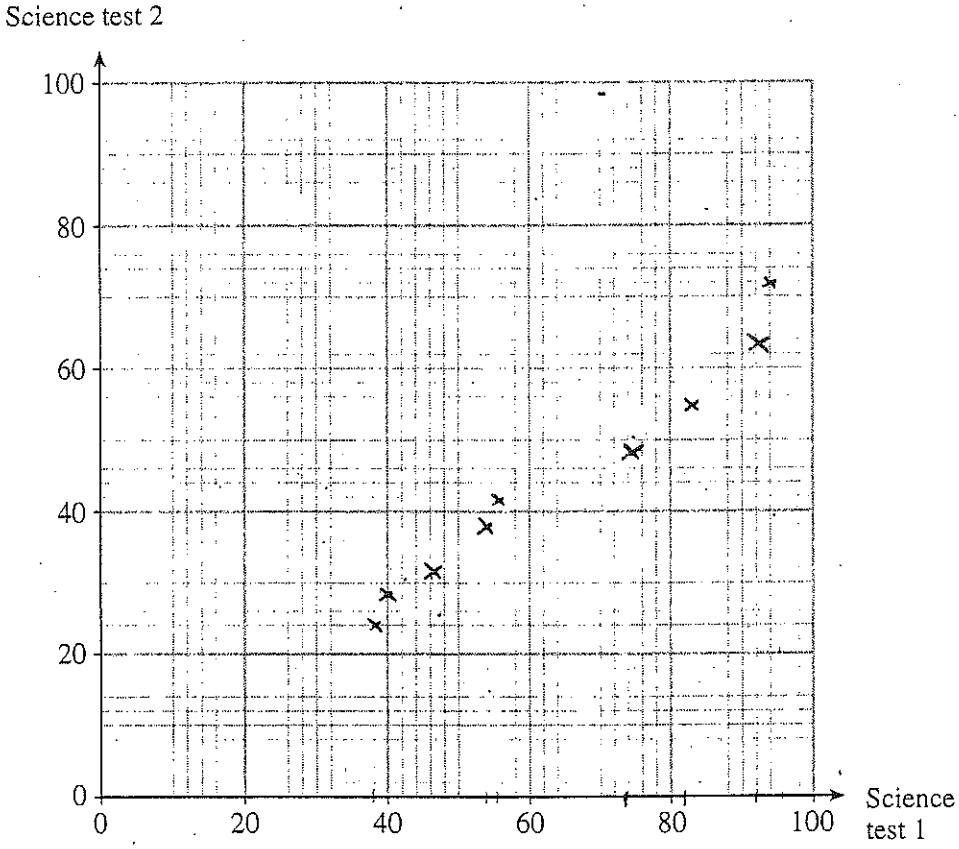
(b) Draw a reflection of the following triangle in the x-axis. [1]



15. The following table shows the pairs of marks obtained by a set of pupils in two science tests.

Science test 1	74	92	56	38	54	82	40	46	96
Science test 2	48	64	42	24	38	56	28	32	72

(a) On the graph paper below draw a scatter diagram for these tests. [2]



(b) What type of correlation is shown by your scatter diagram?

POSITIVE

[1]

16. *(a)* Solve the following equations.

(i) $3x - 2 = 19$

$3x = 19 + 2$

$3x = 21$

$x = 7$

(ii) $\frac{3x}{5} = 6$

$3x = 6 \times 5$

$3x = 30$

$x = \frac{30}{3}$

$x = 10$

(iii) $4x + 3 = 2x - 5$

$4x - 2x = -5 - 3$

$2x = -8$

$x = -4$

[7]

(b) Factorise $7a + 21$.

$7(a + 3)$

[1]

17. *(a)* Andrew sells his house for £210 000.

(i) The estate agent selling the house charges 1·5% on the first £150 000 of the selling price and 2·4% on the remainder.

Calculate the total amount Andrew has to pay to the estate agent.

1·5% of 150 000

1% = 1500 $1\frac{1}{2}$% = £2250

2·4% of £60 000

0·024 × 60 000 = £1440

= £3690

(ii) Charlie, Mary and Sian buy the house for £210 000.
They contribute to the cost of buying the house in the ratio 8:7:5.
How much does each contribute?

20 R.P = 210 000

1 RP = $\frac{210\,000}{20}$ = £10 500

Charlie 8 parts = 8 × £10500 =

Mary 7 part = 7 × £10500 =

Sian 5 parts = 5 × £10,500

Charlie contributes £ 84,000

Mary contributes £ 73,500

Sian contributes £ 52,500

[7]

(b) Jenny bought some jewellery, in a car boot sale, for £25.
She sold the jewellery to Alan and made a 30% profit.
How much did Alan pay for the jewellery?

10% = £2·50

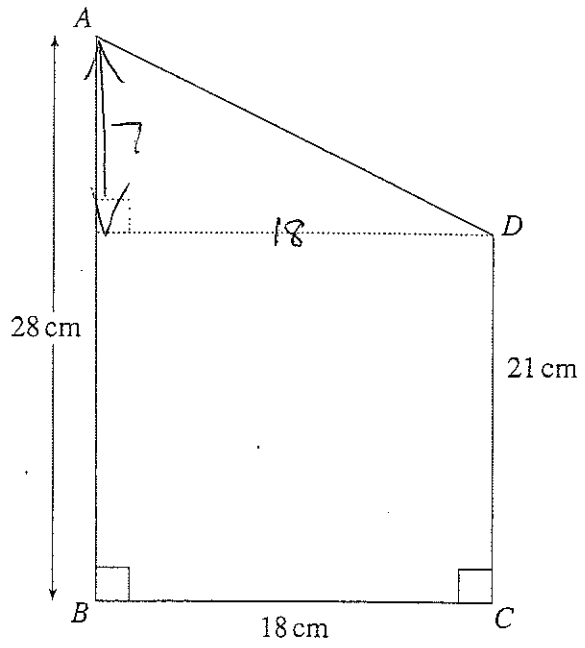
30% = £7·50

Alan paid 25 + 7·50

= £32·50

[3]

18.



The above diagram shows a trapezium $ABCD$ with AB = 28 cm, BC = 18 cm and CD = 21 cm.
Angle ABC = 90° and angle BCD = 90°.
Calculate the length of AD, giving your answer to an appropriate degree of accuracy.

$AD^2 = 7^2 + 18^2$

$AD^2 = 49 + 324$

$AD^2 = 373$

$AD = 19.3\text{cm}$

[5]

19. A solution to the equation

$$x^3 - 5x - 34 = 0$$

lies between 3·7 and 3·8.

Use the method of trial and improvement to find this solution correct to two decimal places.

$x = 3.75$

LHS $= 3.75^3 - 5(3.75) - 34$

$= 52.734375 - 18.75 - 34$

$= -0.016$ Too small.

$x = 3.76$

LHS $= 3.76^3 - 5(3.76) - 34$

$= 53.157376 - 18.8 - 34$

$= +0.3576$ Too big.

$x = 3.755$

LHS $= 3.755^3 - 5(3.755) - 34$

$= 52.945593 - 18.775 - 34$

$= +0.1705$ Too big

[4]

$\therefore$ $x = 3.75$ to 2 d.p.