C68   D56   E45   F34   G23

OCR ☆
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION
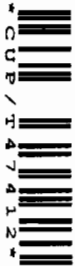**MATHEMATICS SYLLABUS A**
Paper 2 (Foundation Tier)
MONDAY 2 JUNE 2008

J512/02

Afternoon
Time: 2 hours

Candidates answer on the question paper
Additional materials (enclosed):   None

Additional materials (required):
Electronic calculator
Geometrical instruments
Tracing paper (optional)

Solutions

Candidate Forename		Candidate Surname	

Centre Number		Candidate Number	

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **100**.
- You are expected to use an electronic calculator for this paper.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.

FOR EXAMINER'S USE

1 Here is a list of numbers.

<div align="center">

6   7   9   11   13   20   26   47   51

</div>

(a) From this list, write down

    (i) an even number,

                                        (a)(i) _6 , or 20, or 26_ [1]

    (ii) a square number,

                                          (ii) _9_ [1]

    (iii) two numbers that add to give 37,

                                          (iii) _26_ and _11_ [1]

    (iv) two numbers that subtract to give 25.

                                          (iv) _51_ and _26_ [1]

(b) **(i)** From the same list, write down a multiple of 5.

                                        (b)(i) _20_ [1]

    (ii) Explain how you know that this is a multiple of 5.
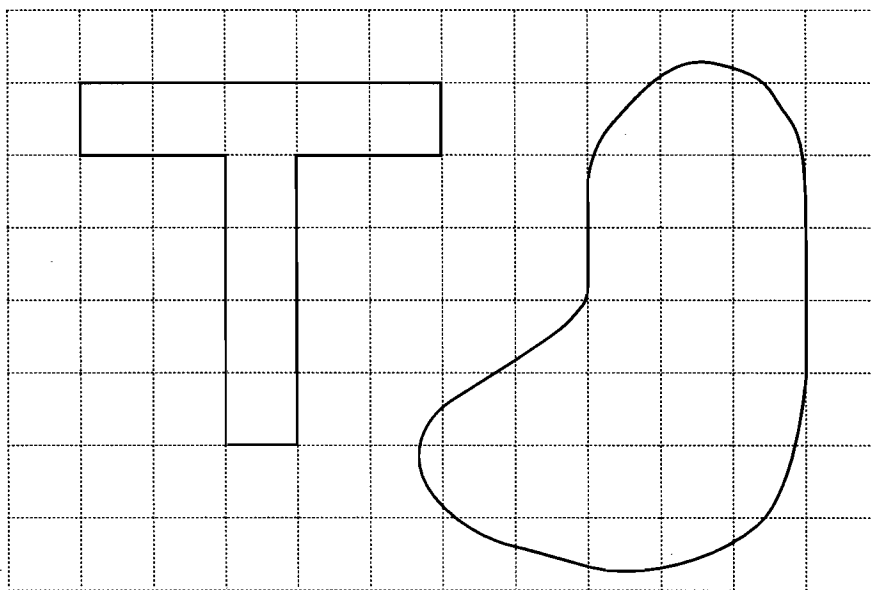
    Ends in a zero

                                                      [1]

(c) **(i)** Which number in the list is a factor of 33?

                                        (c)(i) _11_ [1]

    (ii) Explain how you know that this is a factor of 33.

    _11 × 3 = 33_

                                                       [1]

[Turn over

2   The shapes below are drawn on a grid of 1 cm squares.

(a) Find the perimeter of the **T** shape.

....

....

(a) _____2 O_____ cm [1]

(b) Find the area of the **T** shape.

....

....

(b) _____9_____ cm² [1]

(c) Estimate the area of the curved shape.

....

....
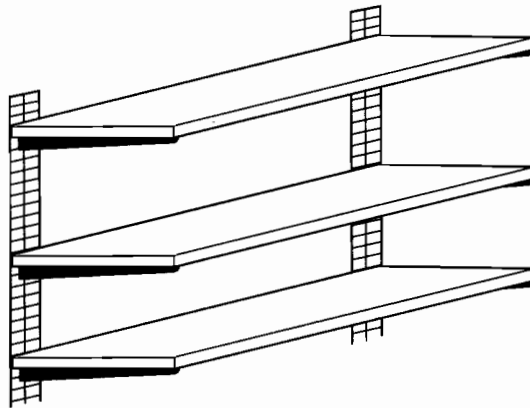
Allowed 22 - 26   **(c)** _____25_____ cm² [2]

(d) Describe a method you could use to estimate the perimeter of the curved shape.

Count as 1cm lengths in a square that look
more than ½ cm. Ignore lengths that look less
than ½ cm.   [1]

3 **(a)**

Tina wants to build some shelves in her bedroom.
She goes to the DIY store to buy what she needs.

Fill in the 5 gaps in her bill.

....

....

....

2 supports at £3.55 each.	£ 7.10
3 pairs of brackets at £2.49 for each pair.	£ 7.47
5.4 metres of shelving at £2.20 per metre.	£ 11.88
3 packets of screws at £0.62 per packet.	£ 1.86
TOTAL	£ 28.31

[5]

(b) Alan has £20.
He wants to buy some football magazines.
They cost £2.99 each.

What is the greatest number of football
magazines that Alan can buy?

$£20 \div £2.99 = 6.68$

....

....

(b)   6   [2]

[Turn over

4

Thai

Indian

90°

100° 120°

Pizza

Chinese

NOT TO SCALE
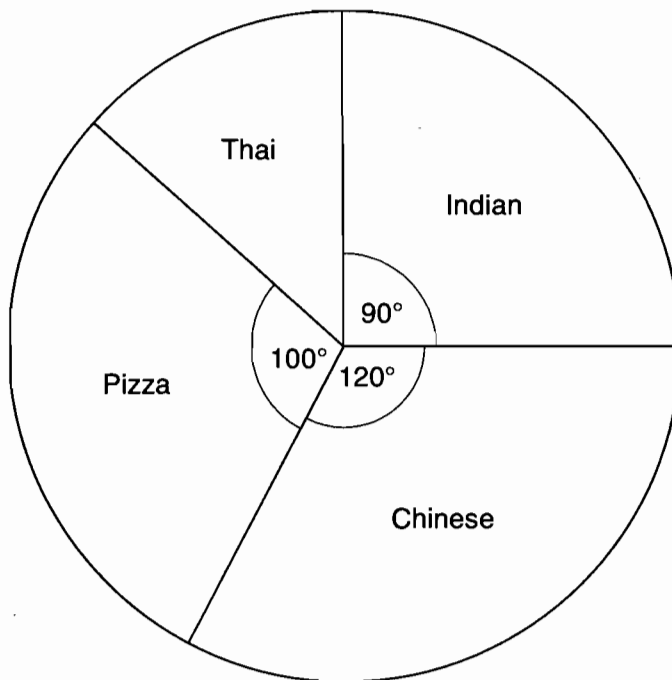
This pie chart represents the favourite takeaway foods of 180 students.

(a) Which takeaway food was the favourite of $\frac{1}{4}$ of these students?

....

(a) _____Indian_____ [1]

(b) What fraction of these students chose Chinese?

$\frac{120}{360} = \frac{1}{3}$

....

(b) _____$\frac{1}{3}$_____ [1]

(c) Work out the size of the angle for Thai.

$360 - (100 + 120 + 90) = 50°$

....

(c) _____$50°$_____ ° [2]

(d) How many of the 180 students chose Pizza?

$180 \times \frac{100}{360} = 50$

....

(d) _____50_____ [2]

5 The table shows the distances, in miles, between some places in England.
For example, the distance between Birmingham and Shrewsbury is 48 miles.

(a) **(i)** How far is it from Birmingham to Northampton?

(a)(i) ___56___ miles [1]

(ii) The distance between Gloucester and Oxford is 12 miles less than the distance between Birmingham and Hereford.

Fill in the gap in the table.

47 miles

....[2]

(iii) Pranav left Birmingham and went to Northampton.
From Northampton he went to Oxford and then straight back to Birmingham.

Work out how far he travelled altogether.

B → N = 56   N → O = 44   O → B = 68

56 + 44 + 68 =

(iii) ___168___ miles [2]

(b) This word formula connects *distance, speed* and *time.*

"Time equals distance divided by speed"

Pranav went from Oxford to Shrewsbury at a speed of 40 miles per hour.
Work out how long it took him.

$$\frac{120}{40} = 3$$

(b) ___3___ hours [2]

[Turn over

6
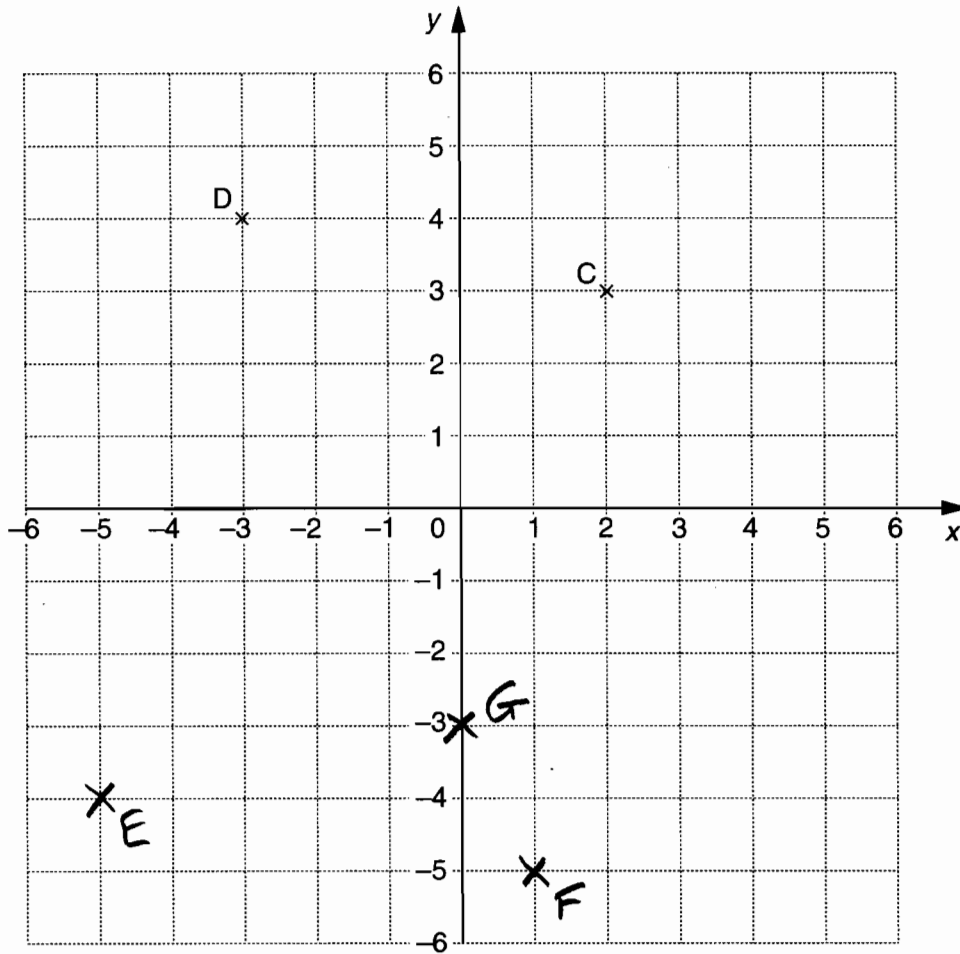
(a) Write down the coordinates of the points C and D.

(a) C (___2___ , ___3___) [1]

D (___−3___ , ___4___) [1]

(b) Plot and label the points E (−5, −4), F (1, −5) and G (0, −3). [3]

7 **(a)** This is a diagram of an open box.

1 cm

3 cm

6 cm
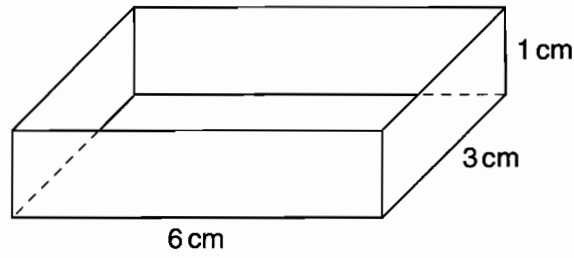
Draw a net of the open box.
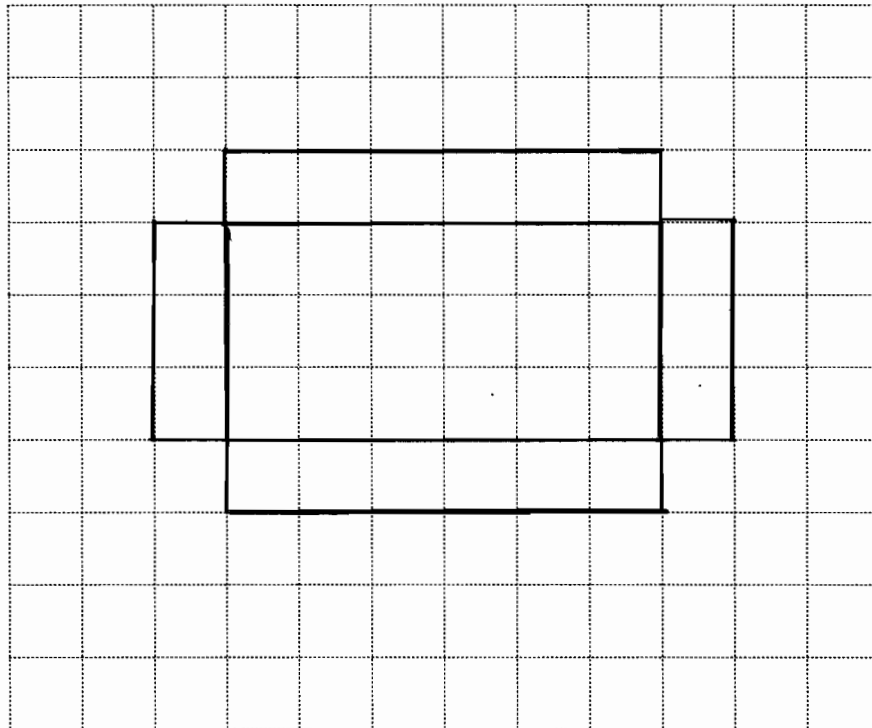
[3]

(b) **(i)** Calculate the size of angle *p*.
Give a reason for your answer.

NOT TO
SCALE

p

$90°$

63°
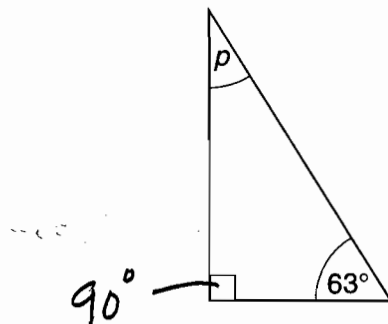
p = ___27___ ° because ___angles of △ add up to 180°___

___[2]___

[Turn over

(b) (ii) Calculate the size of angle f in this isosceles triangle.

40°

NOT TO SCALE

f
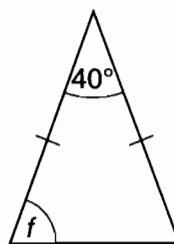
$180 - 40 = 140$ $\dfrac{140}{2} = 70°$

(b)(ii) _____ $70°$ ___ ° [2]

8 (a) Solve.

(i) $x + 6 = 13$

$x = 13 - 6$
$x = 7$

(a)(i) _____ $x = 7$ ___ [1]

(ii) $4x = 12$

$x = \dfrac{12}{4}$ $x = 3$

(ii) _____ $x = 3$ ___ [1]

(iii) $2x + 5 = 10$

$2x = 10 - 5$

$2x = 5$

$x = 5/2$ **(iii)** _____ $x = 2\frac{1}{2}$ ___ [2]

(b) (i) Use the formula $y = 3t + 2$ to work out the value of y when $t = 13$.

$y = 3 \times 13 + 2$ $y = 41$

(b)(i) _____ $y = 41$ ___ [2]

(ii) Use the formula $M = A + 4B$ to work out the value of M when $A = 12$ and $B = -2$.

$M = 12 + 4(-2)$

$M = 12 - 8$

$M = 4$ **(ii)** _____ $M = 4$ ___ [2]

9 **(a)** Work out.

$5\overline{)13^35}$ $27 \times 3 = 81$

(i) $\frac{3}{5}$ of 135

$\frac{}{27}$

(a)(i) _____ 81 _____ [2]

(ii) 2^5

(ii) _____ 32 _____ [1]

(iii) 5^3

(iii) _____ 125 _____ [1]

(b) Work out.

$2.1^2 + \sqrt{0.36}$

(b) _____ 5.01 _____ [1]

(c) **(i)** Work out.

$\frac{1}{0.41^2}$

Write down all the numbers on your calculator display.

(c)(i) _5.948839976_ [1]

(ii) Write your answer to part **(c)(i)** correct to 1 decimal place.

(ii) _____ 5.9 _____ [1]

[Turn over

10 A bag contains 4 blue balls, 8 green balls and 5 white balls.
A ball is taken from the bag at random.

(a) Find the probability that it is green.

$4 + 8 + 5 = 17$

(a) $\dfrac{8}{17}$ [2]

(b) The probability that it is red is zero.

Explain why this is true.

No red balls in bag so impossible to choose red [1]

11

SARDINES £2.75 kg   PRAWNS
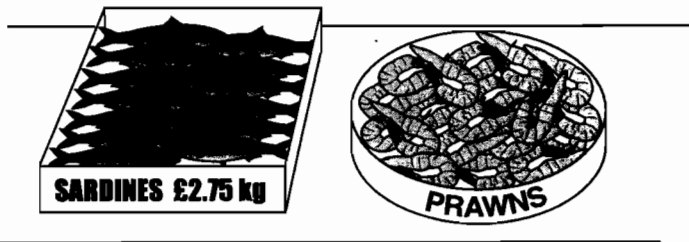
Maria goes to the fish stall.
She buys 2 kg of sardines and 0.5 kg of prawns.
The total cost is £7.70.
The sardines cost £2.75 per kilogram.

How much per kilogram do the prawns cost?

Sardines $2 \times £2.75 = £5.50$

$\therefore$ 0.5 kg of prawns cost $£7.70 - £5.50 = £2.20$
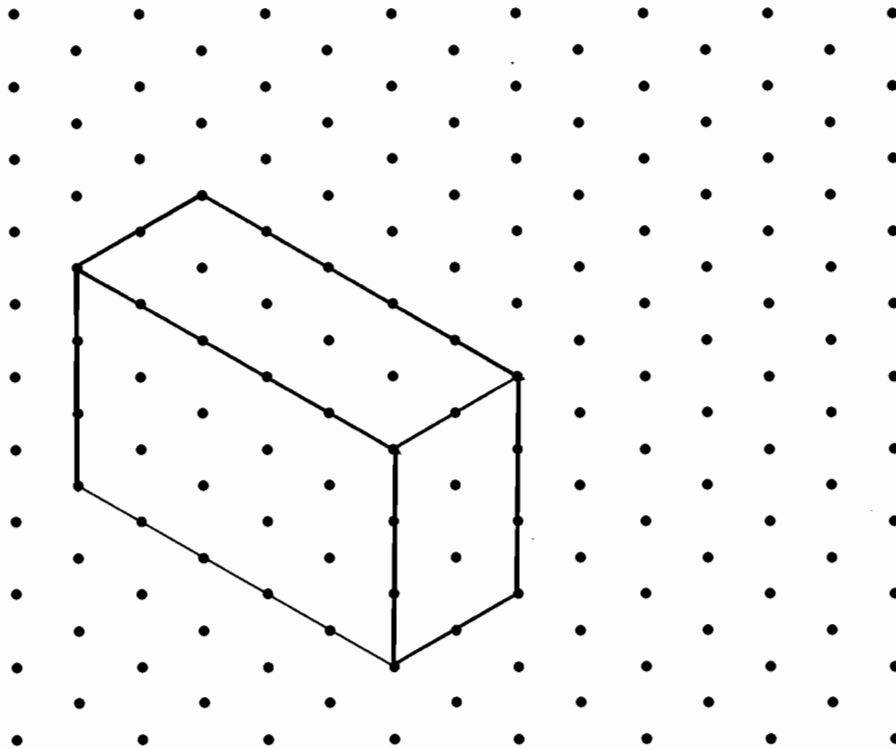
$\therefore$ 1 kg of prawns cost £4.40

£ 4.40 [4]

12 (a) Find the volume of this cuboid.
Give the units of your answer.

3 cm

5 cm

2 cm
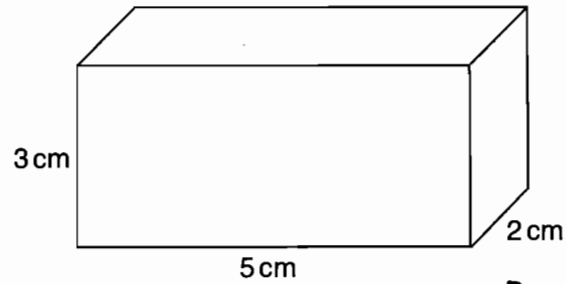
$5 \times 3 \times 2 = 30 cm^3$

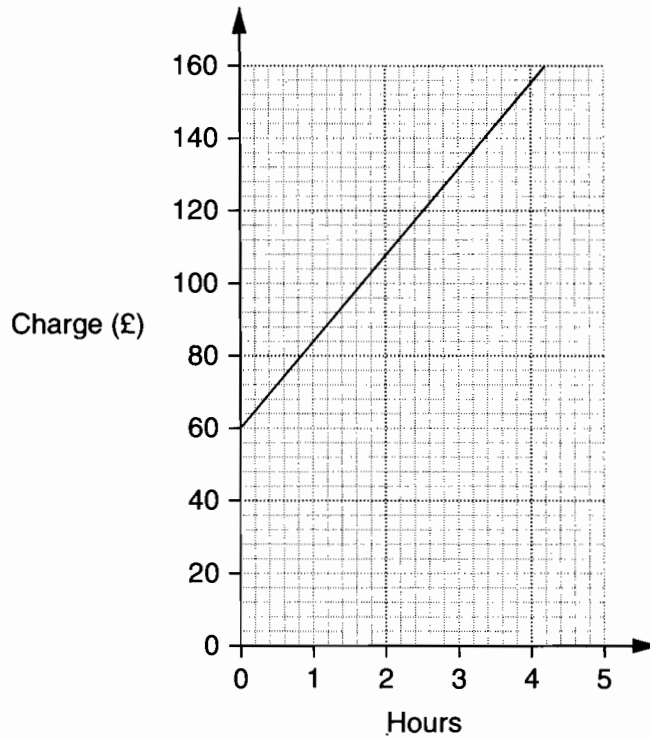(a) $30 cm^3$ [3]

(b) On the dotty paper below, make an isometric drawing of the cuboid.
One of the 5 cm edges has been drawn for you.

[2]

[Turn over

13 An electrician uses this graph to work out how much to charge for each job.

Charge (£)

Hours

The charge for a job is made up of a fixed fee plus an amount for the time that the job lasts.

(a) How much is the fixed fee?

(a) £ _____ 60 _____ [1]

(b) How much would the electrician charge for a job that lasts 5 hours?

From graph extra charge per hour = £24

60 + 5 × 24 = £180

(b) £ _____ 180 _____ [1]

(c) The charge, £C, can be written as a formula in terms of the fixed fee, the rate per hour and the number of hours, h, for the job.

Complete the formula.

....

....

$C =$ _____ 60 _____ + _____ 24 _____ × h   [2]

14 Clare is reading a poetry book.

(a) The shortest poem in the book has one verse and the longest poem has six verses. The poems in the book are from ten to fifteen lines in length.

Design a two-way table for Clare to record the number of verses and the number of lines for the poems in the book.   VERSES   [3]

	1	2	3	4	5	6
10						
11						
12						
13						
14						
15						

LINES

(b) Clare counted the number of letters in each word of one poem.
There were 28 words in the poem.

She drew this table to show her results.

Number of letters	Frequency	Freq × Num
1	2	2
2	5	10
3	6	18
4	8	32
5	2	10
6	3	18
7	2	14
Total	28	104

Calculate the mean number of letters per word in the poem.
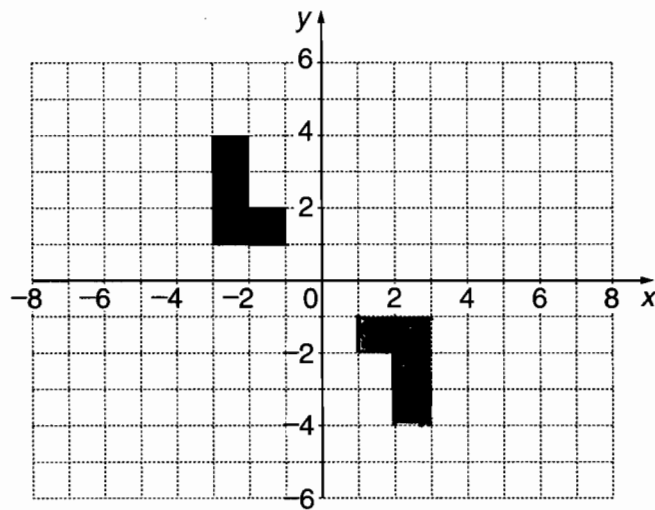
$$\frac{104}{28} = 3.71 \text{ to } 2 \text{ d.p.}$$

(b) _____3.71_____ [3]

15 (a) Reflect the **L** shape in the line $x = 1$.
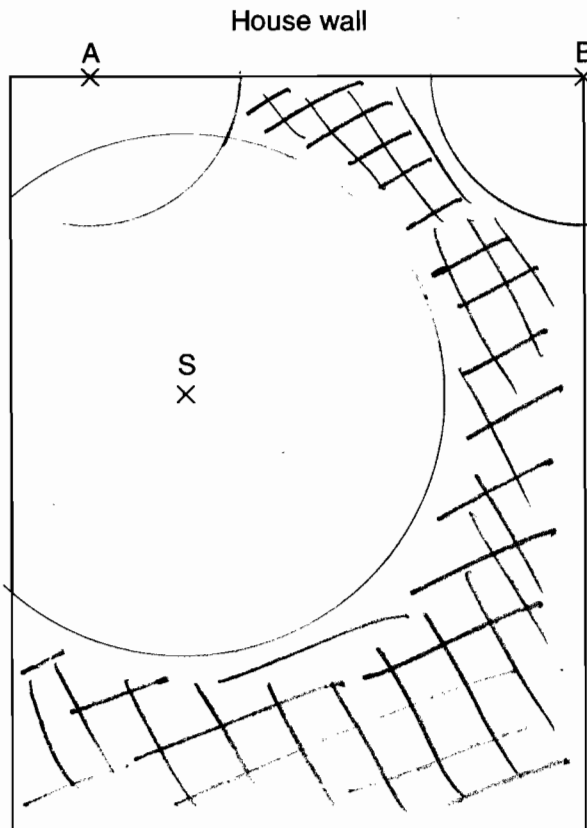

$x = 1$
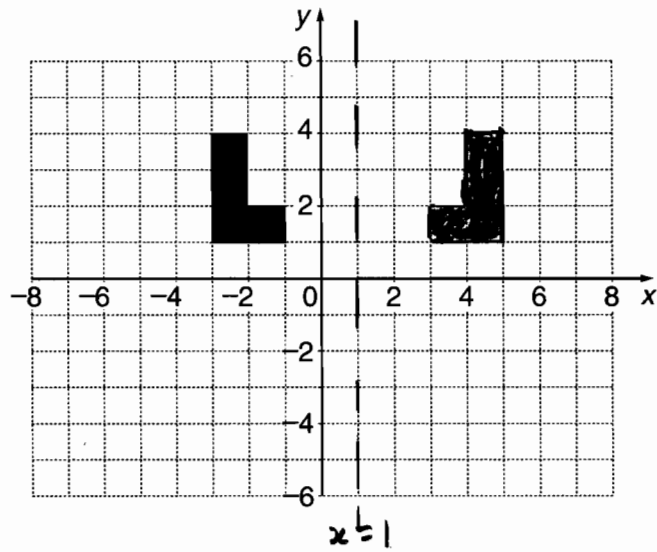
[2]

(b) Rotate the **L** shape 180° about the origin.

[3]

16 The diagram shows the garden of a house.
    There is a security light, S, in the garden and two security lights, A and B, on the house wall.
    The lights are at ground level.

House wall

Scale: 1 cm represents 2 m

Fox can go in shaded area.

The security light in the garden comes on when it detects movement within 7 m.
Each security light on the house wall comes on when it detects movement within 4 m.

A fox is in the garden.

Indicate clearly the region where the fox can move **without** making any of the
security lights come on.   [3]

[Turn over

17 Lewis was baking bread.
    He made the dough and left it to rise.
    The volume of the dough before it had risen was 680 cm³.
    The volume of the dough after it had risen was 1258 cm³.

    Calculate the percentage increase in the volume of the dough.

$$\frac{1258}{680} = 1.85 \qquad \therefore 85\% \text{ increase}$$

_____85_____% [3]

18 Use trial and improvement to solve this equation.

$$x^3 + x = 8$$

    Give your answer to one decimal place.
    Show all your trials and their outcomes.

$$1^3 + 1 = 2$$
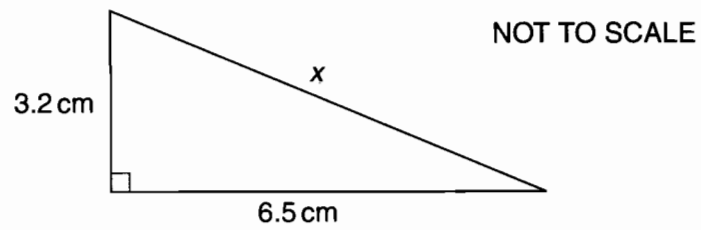$$2^3 + 2 = 10$$
$$1.5^3 + 1.5 = 4.875$$
$$1.8^3 + 1.8 = 7.632$$
$$1.9^3 + 1.9 = 8.759$$
$$1.85^3 + 1.85 = 8.18$$

_____$x = 1.8$_____[4]
                         to 1 d.p

19 Calculate the value of *x*.

3.2 cm

x

NOT TO SCALE

6.5 cm

Pythagoras Theorem

$$x^2 = 3.2^2 + 6.5^2$$

$$x^2 = 52.49$$

$$x = \sqrt{52.49} = 7.24$$

$x = 7.24$ ___ cm [3]