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General Certificate of Secondary Education
June 2005

MATHEMATICS (MODULAR) (SPECIFICATION B)   **33005/I2**
Module 5 Intermediate Tier
Paper 2 Calculator

AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Wednesday 15 June 2005 9.00 am to 10.15 am

In addition to this paper you will require:
• a calculator
• mathematical instruments.

Time allowed: 1 hour 15 minutes

Instructions
• Use blue or black ink or ball-point pen. Draw diagrams in pencil.
• Fill in the boxes at the top of this page.
• Answer **all** questions in the spaces provided.
• Do all rough work in this booklet.
• If your calculator does not have a π button, take the value of π to be 3.14 unless otherwise instructed in the question.

Information
• The maximum mark for this paper is 70.
• Mark allocations are shown in brackets.
• Additional answer paper, graph paper and tracing paper will be issued on request and must be tagged securely to this answer booklet.
• You are expected to use a calculator where appropriate.

Advice
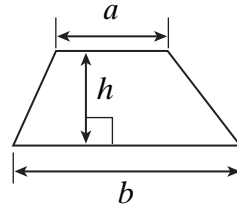• In all calculations, show clearly how you work out your answer.

33005/I2

Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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

Volume of prism = area of cross-section × length
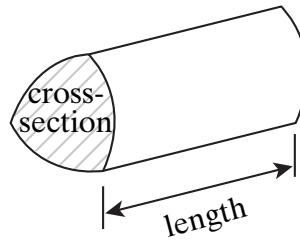
Answer **all** questions in the spaces provided.

1 (a) Triangle *ABC* is isosceles.
AB = AC
Angle *B* = 67°
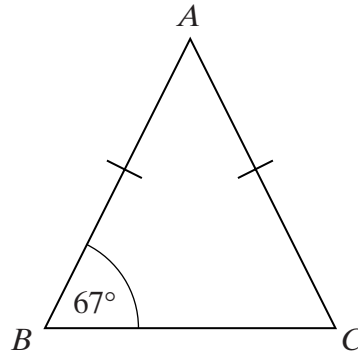
Not drawn accurately

Calculate the size of angle *A*.

....

....

Answer .... degrees   *(2 marks)*

(b) The diagram shows a quadrilateral *PQRS*.
Angle *P* = 145°, angle *Q* = 92° and angle *S* = 74°.
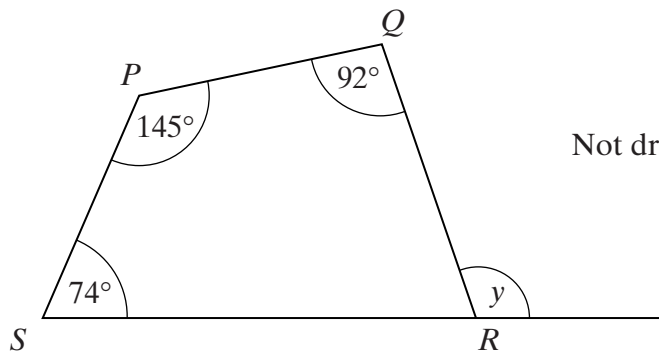
Not drawn accurately

Calculate the value of the exterior angle at *R*, marked *y* on the diagram.

....

....

....

....

Answer .... degrees   *(3 marks)*

$\dfrac{}{5}$

Turn over ▶

2 The diagram shows the plan of a field *ABCD*.
$AB = 8$ m, $AD = 12$ m and $CD = 10$ m.
Angle $A = 60°$ and angle $D = 90°$

Not to scale
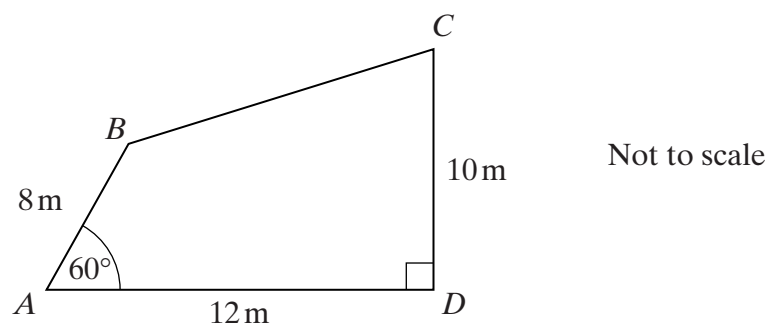
(a) Make a scale drawing of the field.
Use the scale 1 cm represents 2 m.
The line *AD* has been drawn for you.

Scale:
1 cm represents 2 m

A   *D*

(3 marks)

(b) Use your scale drawing to work out the actual length of *BC*.

....

Answer .... m *(2 marks)*

3 Ali is x cm tall.

(a) Suki is 5 cm taller than Ali.

Write down an expression in x for Suki's height.

....

Answer .... cm   *(1 mark)*

(b) Ali's sister is 2 cm shorter than Ali.

Write down an expression in x for the height of Ali's sister.

....

Answer .... cm   *(1 mark)*

(c) Ali's father is twice as tall as Ali.

Write down an expression in x for the height of Ali's father.

....

Answer .... cm   *(1 mark)*

4 Calculate

(a) 3^6

Answer ....   *(1 mark)*

(b) $\dfrac{1}{12.5}$

Answer ....   *(1 mark)*

$\dfrac{}{10}$

Turn over ▶

5 A circular flowerbed has a radius of 1.7 m.

Not drawn accurately

1.7 m
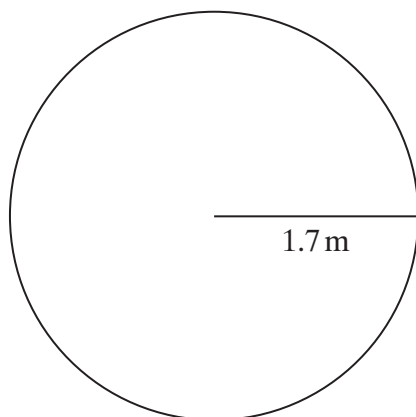
Calculate the area of the flowerbed.
State the units of your answer.

....

....

....

Answer ....   *(3 marks)*

6 Use the formula $v = u + at$

to find the value of v when $u = -10$, $a = 1.8$ and $t = 3.7$

....

....

Answer ....   *(2 marks)*

7 On the grid below, draw the graph of $y = 7 - x$ for values of x from 0 to 7.

....

....

....
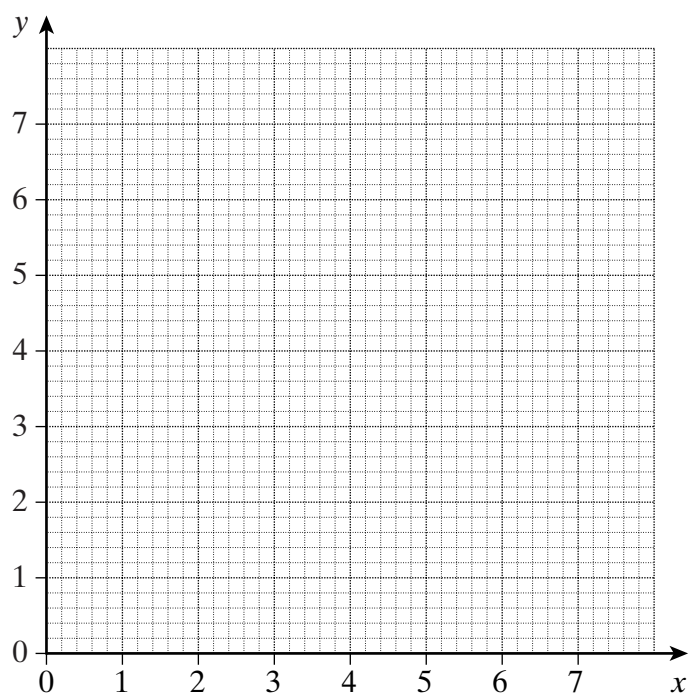
(3 marks)

TURN OVER FOR THE NEXT QUESTION

$\dfrac{}{8}$

Turn over ▶

8 The diagram shows a shaded flag.
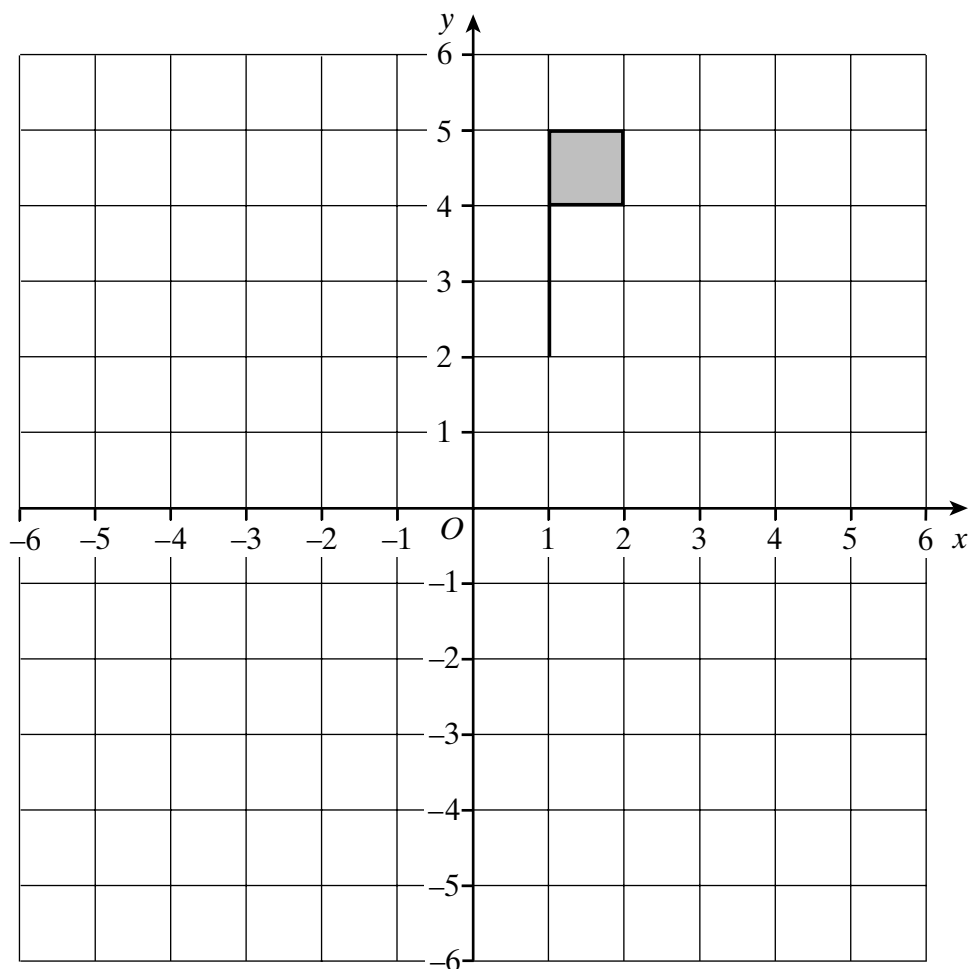
(a) Rotate the shaded flag 90° anticlockwise about the origin.
Label this new flag with the letter *A*.

(3 marks)

(b) Reflect the shaded flag in the line $y = 1$.
Label this new flag with the letter *B*.

(2 marks)

9 Solve the equations.

(a) $4z - 5 = 11$

....

....

....

Answer $z =$ .... *(2 marks)*

(b) $7t - 3 = 6 + t$

....

....

....

Answer $t =$ .... *(3 marks)*

(c) $5x - 1 = 3(x + 2)$

....

....

....

....

Answer $x =$ .... *(3 marks)*

$\dfrac{\ }{13}$

Turn over ▶

10 A sequence of rectangular patterns is shown.
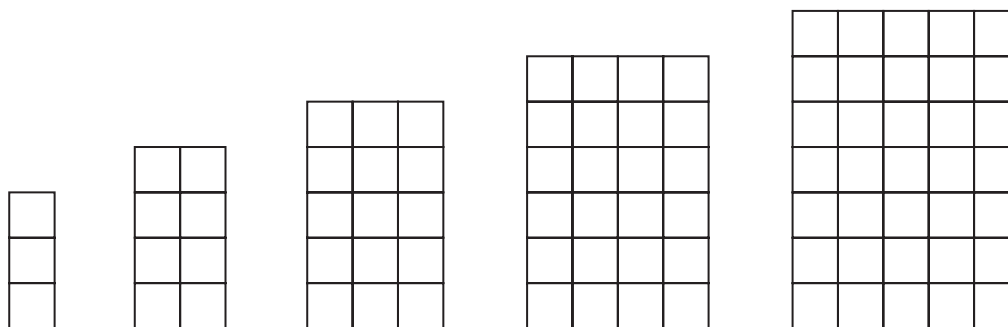
Pattern 1   Pattern 2   Pattern 3   Pattern 4   Pattern 5

(a) Calculate the number of small squares in Pattern 20.

....

....

....

Answer ....   *(2 marks)*

(b) Explain why the number of small squares in Pattern *n* is $n(n + 2)$.

....

....

....

....

(2 marks)

11   The diagram shows a cylindrical can of beans.
The height is 5.7 cm.
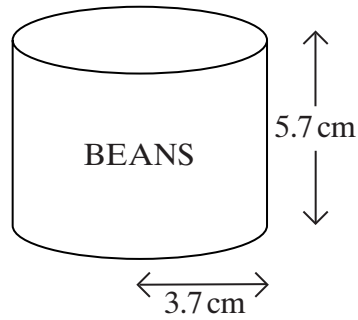The radius of the base is 3.7 cm.

5.7 cm

BEANS

Not to scale

3.7 cm

Calculate the **total** surface area of the can.

....

....

....

....

....

....

....

Answer .... cm^2 *(5 marks)*

9

Turn over ▶

12 (a) Expand and simplify $4(2x - 1) + 3(x + 6)$

....

....

....

Answer .... *(2 marks)*

(b) Expand $x^2(4 - 2x)$

....

....

Answer .... *(2 marks)*

(c) Expand and simplify $(x + 1)(x - 3)$

....

....

....

....

Answer .... *(2 marks)*

13 (a) *ABC* is a right-angled triangle.
  AC = 19 cm and *AB* = 9 cm.

Not to scale

A

19 cm

9 cm

B

C
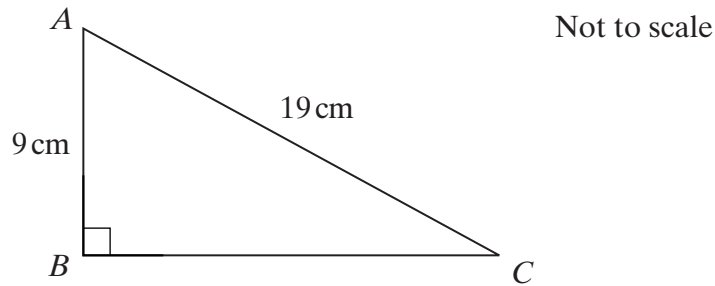
Calculate the length of *BC*.

....

....

....

....

Answer .... cm   *(3 marks)*

(b) *PQR* is a right-angled triangle.
  PQ = 11 cm and *QR* = 24 cm.

P

Not to scale

11 cm

Q

R

24 cm
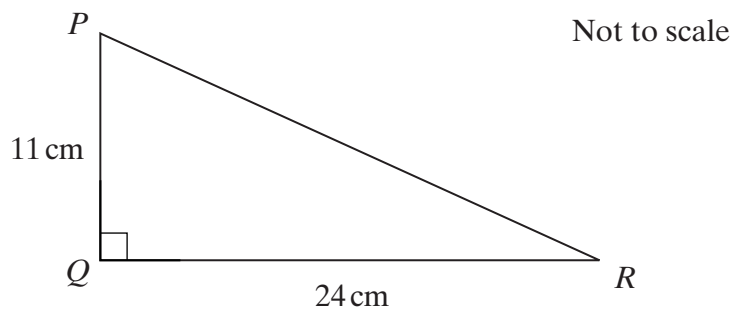
Calculate the size of angle *PRQ*.

....

....

....

....

Answer .... degrees   *(3 marks)*

$\dfrac{}{12}$

Turn over ▶

14

SUPERGROW GARDEN CENTRE

ROSES
£x each

SHRUBS
£y each

(a) Megan buys 4 roses and 3 shrubs.
She pays £33.

Use this information to write down an equation in x and y.

.... *(1 mark)*

(b) Josh buys 6 roses and 6 shrubs.
He pays £57.

Use this information to write down another equation in x and y.

.... *(1 mark)*

(c) Solve your equations simultaneously to find the values of x and y.
You **must** show your working.
Do **not** use trial and improvement.

....

....

....

....

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....

....

Answer $x =$ .... , $y =$ .... *(3 marks)*

15 Match three of these equations with the graphs shown below.

$$y = x + 3$$

$$y = 3x$$

$$y = 3x^2$$

$$y = x^2 + 3$$
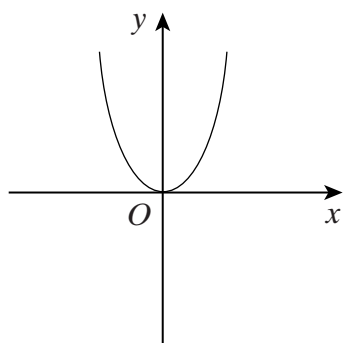
$$y = 3 - x^2$$
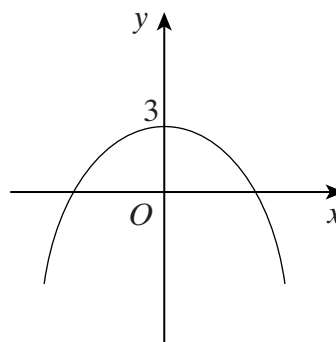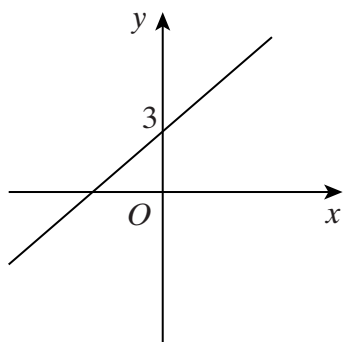
Answer $y =$ .... *(1 mark)*   Answer $y =$ .... *(1 mark)*

Answer $y =$ .... *(1 mark)*

TURN OVER FOR THE NEXT QUESTION

$\dfrac{}{8}$

Turn over ▶

16 (a) Which of these statements are correct?

        P   all isosceles triangles are similar

        Q   all squares are similar

        R   all parallelograms are similar

        S   all regular pentagons are similar

Answer .... *(2 marks)*

(b) These two rectangles are similar.

Not to scale

27 cm

42 cm

x

56 cm
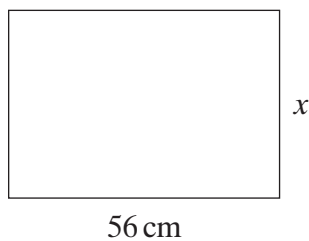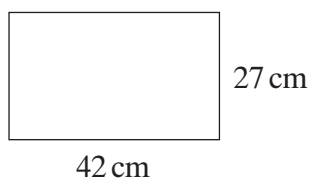
Calculate the value of x.

....

....

....

....

Answer .... cm   *(3 marks)*

END OF QUESTIONS