GCSE   MATHEMATICS

S21-C300

Non-Calculator Assessment Resource I

Foundation Tier

Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a sphere} = \frac{4}{3}\pi r^3$$

$$\text{Volume of a cone} = \frac{1}{3}\pi r^2 h$$

Kinematics formulae

Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

1. *(a)* This shape is drawn on a triangular dotty grid.
Complete this shape so that it has rotational symmetry of order 3. [2]
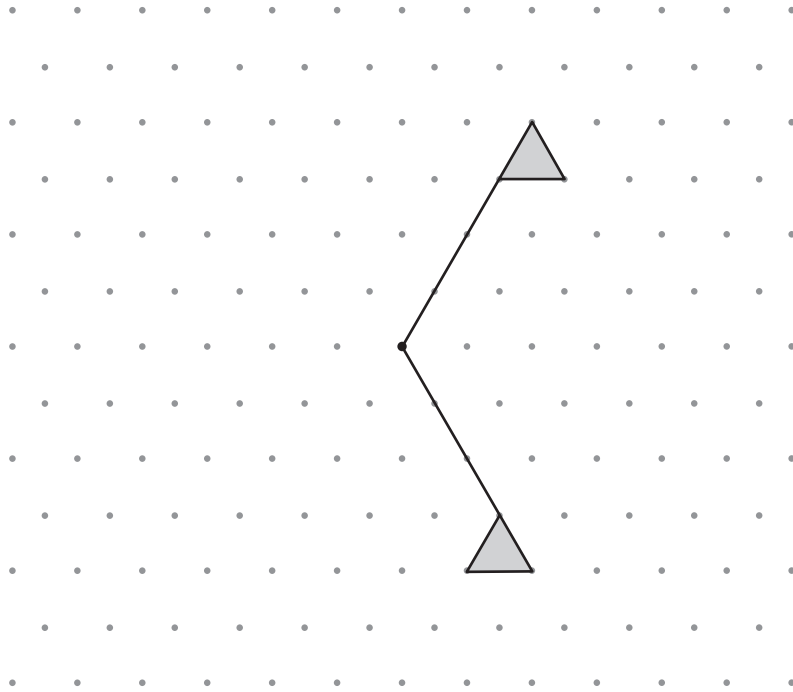
(b) This shape is drawn on a square dotty grid.
Complete the shaded shape so that *L* is a line of symmetry.

You must shade the smallest possible number of squares. [2]

2. Fifty students in a small school voted for their Head Girl and Head Boy.

   (a) The three candidates for Head Girl were Abby, Bea and Cherry.
       The frequency table shows the tally of the votes for 30 of the students.

Candidate	Tally	Frequency
Abby	卌 卌	
Bea	卌 III	
Cherry	卌 卌 II	

   The remaining 20 votes are shown below.

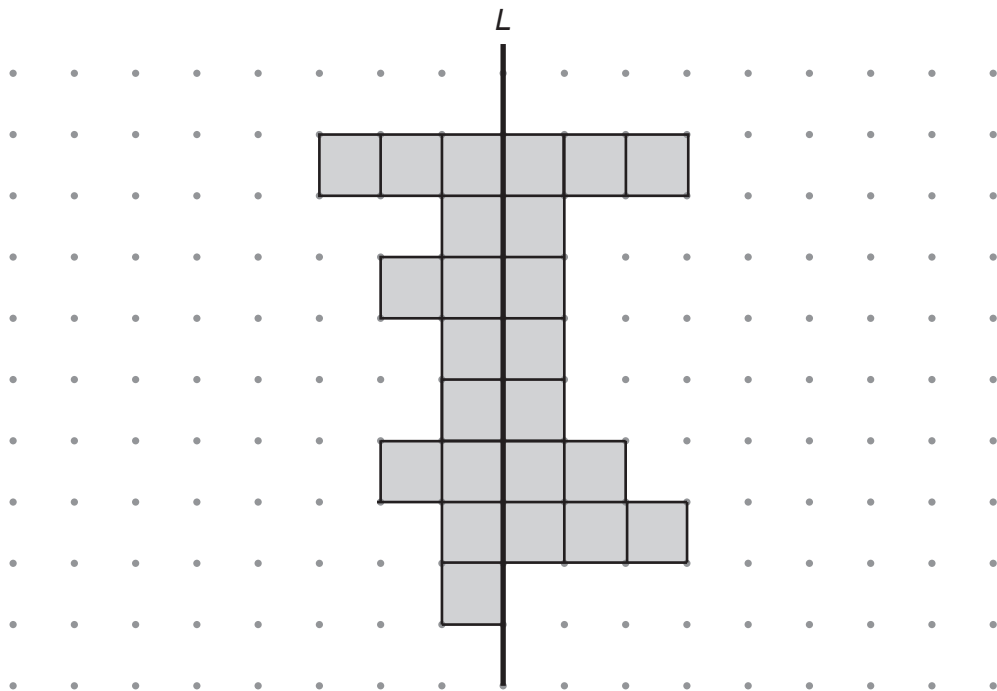 | | | | | |
   |---|---|---|---|---|
   | Abby | Bea | Abby | Abby | Cherry |
   | Bea | Abby | Bea | Cherry | Abby |
   | Cherry | Abby | Bea | Abby | Cherry |
   | Bea | Cherry | Abby | Bea | Abby |

   Which girl won the vote?
   You must show all your working. [2]

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   (b) The frequency table shows the results of voting for the Head Boy.

Candidate	Frequency
Dan	13
Eli	20
Fred	17

   What percentage of the 50 students voted for the winning boy? [2]

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3. *(a)* Simplify each of the following.

(i) $3x - 2y + x - 7y$ [2]

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(ii) $7(x+2) - 5$ [2]

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(iii) $\dfrac{4x \times 5x}{2}$ [2]

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(b) (i) A can contains w ml of lemonade.
Taka drinks 15 ml of lemonade from the can.

Write an expression, in terms of w, for the amount of lemonade that is left in the can.
[1]

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(ii) In the first week of April, Johan made r bird boxes.
In the second week of April, Johan made half as many bird boxes as he did the week before.

Write an expression, in terms of r, for the number of bird boxes Johan made in the second week of April. [1]

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4. *(a)* Here is a number machine.

| INPUT | → | Subtract 2 | → | Divide by 10 | → | OUTPUT |
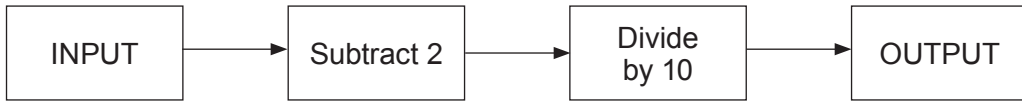
(i) The input is 45.
What is the output? [1]

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(ii) The output is 0·9.
What is the input? [1]

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(b) This number machine can be used to find coordinates (x, y).

| x | → | Multiply by 4 | → | Add 1 | → | y |
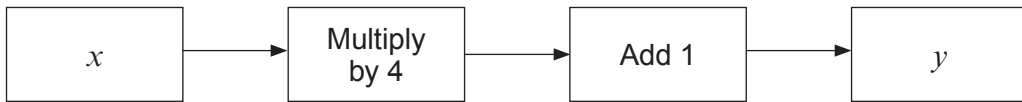
(i) Use the number machine to complete these coordinates. [3]

(2, ...)   (0·5, ...)   (−1, ...)   (......... , 5)

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(ii)   These coordinates can be used to draw a straight line.

    Plot the coordinates found by the number machine and draw the line.   [3]
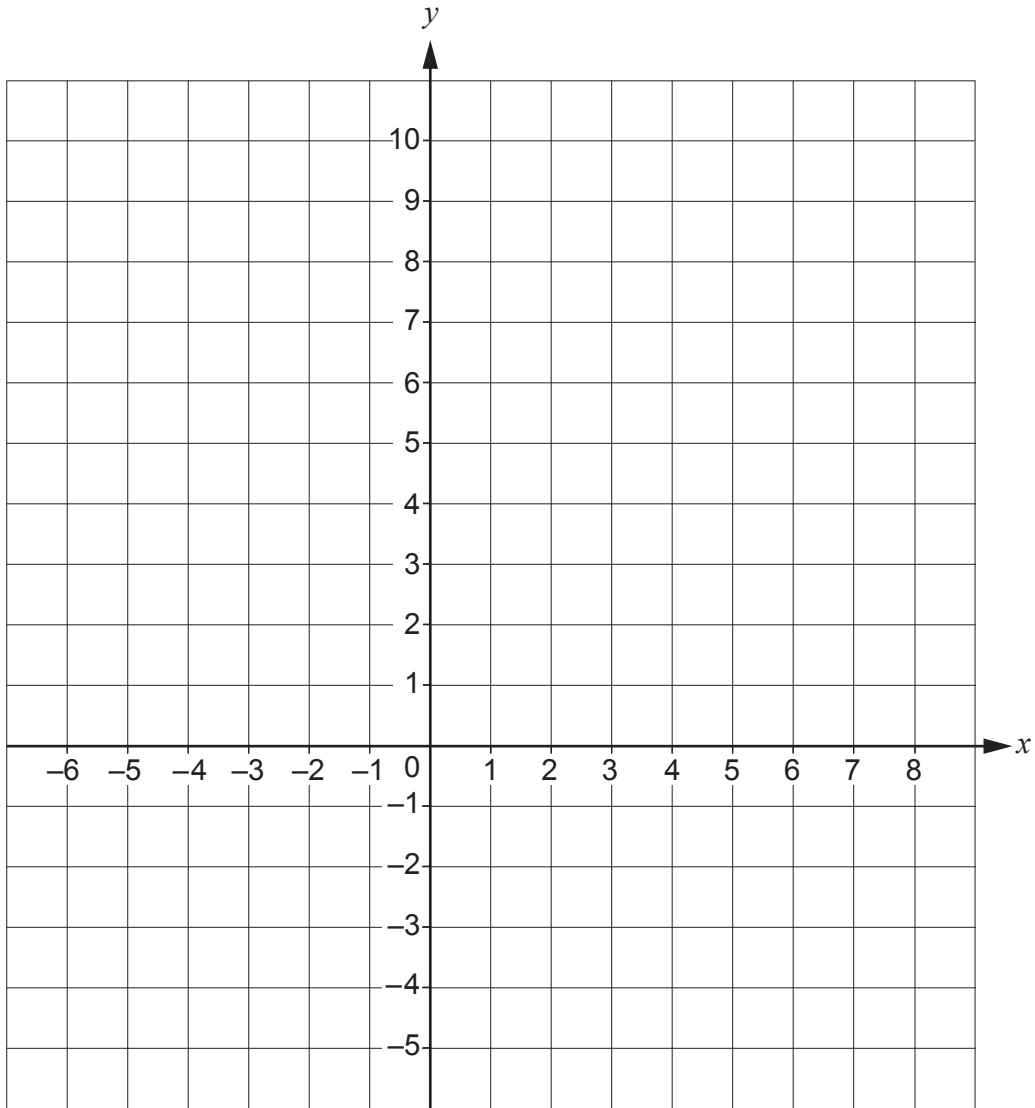
5. Solve the following equations.

(a) $\dfrac{x}{3} = 8$ [1]

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(b) $5x - 8 = 7$ [2]

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6. *(a)*
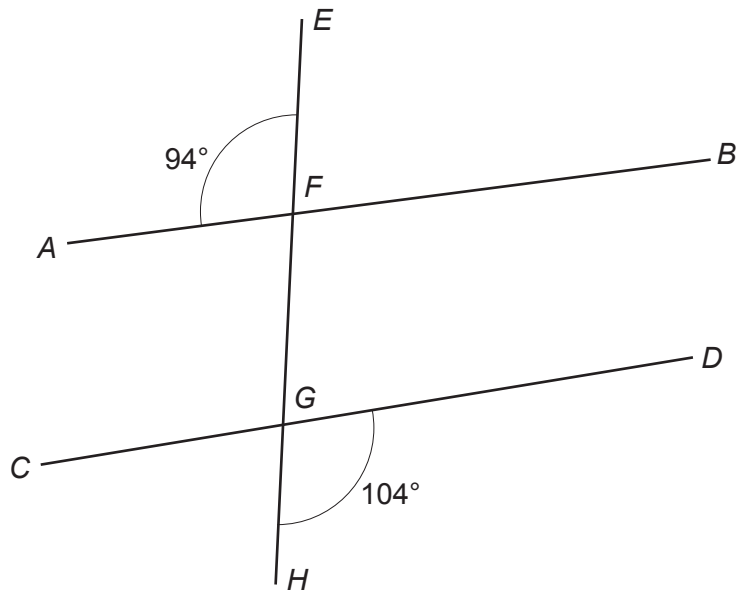
Diagram not drawn to scale

Show that *AB* and *CD* are **not** parallel.
Give a reason for each step of your answer. [2]

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(b)
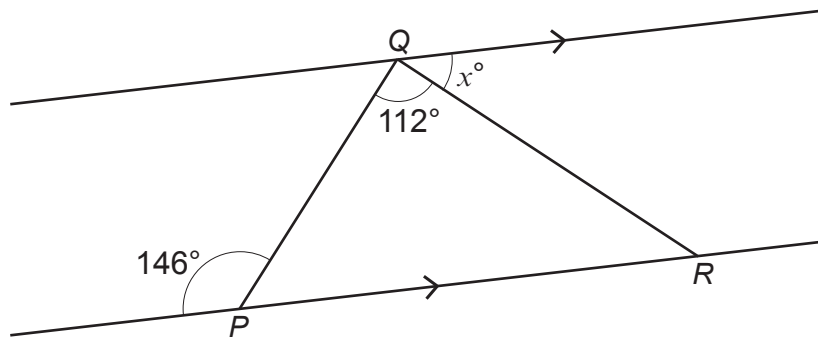
Diagram not drawn to scale

(i) Calculate the value of x.
Give reasons and calculations to support your answer. [3]

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$x = $ ....°

(ii) Write down the mathematical name for triangle *PQR*.
Give a reason for your answer. [1]

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7. A line L has equation $y = 12 - 4x$.

Write down the equation of a different line that is parallel to L. [1]

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8. Factorise $3x^2 - 4xy$. [1]

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9. A cinema has standard seats and premier seats.
Omar and Fatima each book some cinema tickets.

Omar books 3 standard and 2 premier seats and pays £30.
Fatima books 2 standard and 4 premier seats and pays £40.

Use an algebraic method to work out the difference in cost between a standard seat and a premier seat. [5]

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Difference in cost between a standard seat and a premier seat is £ ....