



# Using Results Plus Data – [YouTube Training Video](#)

- Identify BOTH strong and weaker topics
- SOW
  - Sequencing
  - Hours allocation
- Keep an eye on KS3 skills
  - Lesson starters
- Use revision more creatively
  - Lesson starters

# Agenda

- Foundation – Main
- Foundation – Regional
- Higher – Main
- Higher – Regional
- Crossover data
- Analysing your own results

# Foundation

# Foundation 1 and 2

Qu	Topic	Score	Max score	ALL	5	4	3	2	1
Q01	Basic arithmetic, place value, number formation	2.71	4	68%	89%	82%	72%	59%	52%
Q02	Probability (likelihood words)	2.22	3	74%	89%	82%	76%	68%	51%
Q03	Angles, polygons, units conversion	3.3	5	66%	94%	84%	76%	57%	27%
Q04	Coordinates, midpoint, plotting points	2.78	4	70%	98%	92%	79%	68%	32%
Q05	Percentages, decimals, fractions	3.19	4	80%	94%	95%	89%	78%	63%
Q06	Solving simple equations	1.62	2	81%	100%	98%	95%	84%	57%
Q07	Money, percentage discount, change calculation	2.26	4	57%	89%	85%	70%	39%	20%
Q08	Linear functions, tables, graph plotting	3.12	4	78%	98%	99%	93%	81%	22%
Q09	Angles in shapes (kite, triangle)	2.32	4	58%	98%	86%	66%	39%	0%
Q10	Percentages, ordering fractions, brackets	2.48	4	62%	89%	83%	70%	59%	30%
Q11	Combinations (choices)	1.44	2	72%	99%	95%	92%	76%	50%
Q12	Calculator arithmetic	1.55	2	78%	89%	83%	91%	84%	90%
Q13	Fraction addition	1.32	2	66%	95%	81%	71%	62%	40%
Q14	Venn diagrams, probability	1.88	3	63%	88%	81%	72%	64%	13%
Q15	Probability (dice & spinner, tables)	2.77	4	69%	93%	87%	72%	61%	43%
Q16	Algebra: factorising, expanding, simplifying	1.54	3	51%	82%	76%	61%	35%	13%
Q17	Speed (distance/time)	1.64	2	82%	99%	92%	92%	79%	60%
Q18	Area (compound shapes), practical application	1.67	4	42%	92%	76%	48%	19%	3%
Q19	Fraction multiplication, mixed numbers	0.96	3	32%	57%	45%	32%	18%	9%
Q20	Bounds, estimation	0.79	4	20%	59%	32%	16%	8%	0%
Q21	Probability (expected value, spinner)	1.32	4	33%	88%	61%	29%	10%	0%
Q22	Area (triangle, semicircle, compound region)	0.63	3	21%	70%	42%	21%	3%	0%
Q23	Laws of indices, simplifying expressions	2.14	4	54%	74%	68%	56%	39%	25%
Q24	Pressure, area, force (applied maths)	0.94	3	31%	91%	64%	30%	18%	11%
Q25	Solving equations, factorising quadratics	1.3	6	22%	52%	29%	19%	9%	0%
Q26	Sets, set notation, logic	0.81	5	16%	39%	20%	15%	9%	1%
Q27	Indices, arithmetic	1.49	3	50%	89%	73%	56%	24%	9%
Q28	Area of trapezium, geometry	0.45	5	9%	56%	14%	1%	0%	0%

Qu	Topic	Score	Max score	ALL	5	4	3	2	1
Q01	Sequences (finding terms, explanations)	3.56	4	89%	97%	94%	93%	87%	73%
Q02	Congruence, symmetry, enlargement (triangles)	3	4	75%	95%	89%	80%	61%	35%
Q03	Number lines, place value	1.65	2	83%	98%	93%	83%	75%	60%
Q04	Time (24-hour clock, duration)	2.25	3	75%	99%	86%	74%	65%	44%
Q05	Angles, measurement, circles (radius/tangent), symmetry	3.55	6	59%	84%	75%	61%	41%	20%
Q06	Data handling (frequency table, bar chart)	4.51	5	90%	100%	95%	93%	87%	65%
Q07	Simultaneous equations (cost problem)	3.1	4	78%	98%	93%	81%	63%	42%
Q08	Pie charts, ratio, angle calculation	2.44	5	49%	88%	68%	50%	18%	15%
Q09	Capacity, division, remainder (litres to millilitres)	2.83	4	71%	91%	95%	71%	52%	17%
Q10	Percentages, ratio to percentage	2.68	4	67%	96%	87%	71%	43%	23%
Q11	Substitution, error explanation, odd numbers	1.6	3	53%	89%	66%	56%	28%	18%
Q12	Algebra: simplifying, formulae, nth term, expressions	4.06	8	51%	82%	63%	45%	35%	26%
Q13	Lowest common multiple (LCM)	1.14	2	57%	78%	77%	46%	52%	30%
Q14	Bearings	0.19	2	10%	26%	8%	5%	1%	0%
Q15	Proportion, scaling (recipe/ingredients)	3.2	4	80%	93%	94%	82%	74%	42%
Q16	Statistics (range, median, mode, card completion)	1.54	3	51%	87%	71%	50%	25%	9%
Q17	Surface area (trapezium prism)	0.63	3	21%	50%	38%	14%	2%	0%
Q18	Percentage loss	2	3	67%	96%	82%	68%	40%	31%
Q19	Geometric construction (perpendicular bisector)	0.56	2	28%	61%	31%	26%	10%	10%
Q20	Sequences (nth term, counterexample for primes)	1.23	3	41%	86%	57%	39%	13%	4%
Q21	Similar shapes, ratio, proportional reasoning	1.81	4	45%	89%	78%	36%	12%	0%
Q22	Ratio, money sharing, adjustment	1.81	4	45%	87%	68%	40%	16%	2%
Q23	Mean from grouped data (frequency table)	0.76	4	19%	57%	24%	10%	2%	3%
Q24	Compound interest/growth (percentage increase)	1.54	3	51%	91%	54%	54%	27%	11%
Q25	Simultaneous equations (algebraic solution)	0.96	3	32%	68%	41%	35%	8%	2%
Q26	Inequalities, regions (graphing inequalities)	0.79	5	16%	46%	18%	13%	3%	1%
Q27	Standard form (conversion, calculation)	0.85	3	28%	64%	39%	26%	6%	7%

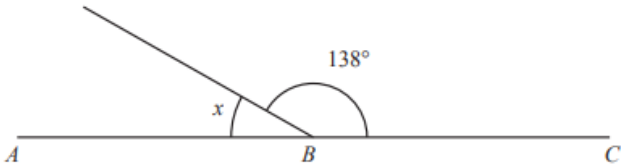


# Foundation 1

Question	Marks	ALL	5	4	3	2	1
Q03a	1	81%	100%	97%	89%	75%	13%
Q03b	1	60%	85%	70%	65%	57%	40%
Q03c	1	59%	90%	89%	68%	45%	33%
Q03d	1	66%	100%	84%	79%	57%	20%
Q03e	1	64%	95%	78%	79%	51%	27%
Total	5	66%	94%	84%	76%	57%	27%

3 *ABC* is a straight line.

Diagram **NOT**  
accurately drawn



(a) Work out the size of angle  $x$

(1)

(b) Circle the correct mathematical name for an angle that measures  $138^\circ$

right-angle      obtuse      reflex      acute

(1)

(c) Write down the mathematical name for a polygon with 8 sides.

(1)

(d) Change 5300 grams into kilograms.

..... kilograms  
(1)

(e) Change 4.7 metres into centimetres.

..... centimetres  
(1)

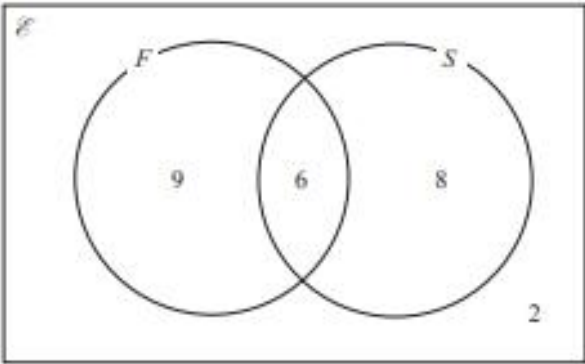
(Total for Question 3 is 5 marks)

# Foundation 1

Question	Marks	5	4	3	2	1
Q14a	1	67%	85%	76%	75%	68%
Q14b	2	61%	89%	84%	70%	62%
Total	3	63%	88%	81%	72%	64%

14 Some students were asked if they study French ( $F$ ) or Spanish ( $S$ )

The Venn diagram gives information about the results.  
The values shown represent numbers of students.



(a) How many of these students study only French or only Spanish?

(1)

One of these students is chosen at random.

(b) Find the probability that this student studies both French and Spanish.

(2)

(Total for Question 14 is 3 marks)

# Foundation 1

16 (a) Factorise  $9e + 12g$

(1)

(b) Expand and simplify  $x(x + 5) + 3(2x - 4)$

(2)

(Total for Question 16 is 3 marks)

Question	Marks	ALL	5	4	3	2	1
Q16a	1	42%	75%	76%	44%	17%	7%
Q16b	2	56%	85%	76%	70%	45%	17%
Total	3	51%	82%	76%	61%	35%	13%



# Foundation 1

**20** The height of a tree is 17.8 metres correct to one decimal place.

(a) Write down the lower bound for the height of the tree.

..... metres  
(1)

The weight of an apple is 145 grams correct to the nearest 5 grams.

(b) Write down the upper bound for the weight of the apple.

..... grams  
(1)

$$A = \frac{4.766 \times 815}{0.399}$$

(c) By rounding each number to one significant figure, work out an estimate for the value of  $A$   
Show your working clearly.

Question	Marks	ALL	5	4	3	2	1
Q20a	1	23%	70%	46%	21%	8%	0%
Q20b	1	8%	15%	5%	4%	0%	0%
Q20c	2	24%	76%	39%	20%	13%	0%
Total	4	20%	59%	32%	16%	8%	0%

# Foundation 1

Question	Marks	ALL	5	4	3	2	1
Q26a	2	18%	40%	27%	15%	7%	4%
Q26b	1	30%	65%	43%	39%	23%	0%
Q26c	2	8%	25%	3%	4%	5%	0%
Total	5	16%	39%	20%	15%	9%	1%

26  $\mathcal{E} = \{18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$

$A = \{\text{even numbers}\}$

$B = \{\text{multiples of 3}\}$

$C = \{\text{multiples of 5}\}$

(a) List the members of the set  $(A \cup B)^c$

(2)

Sophie writes down the statement  $B \cap C = \emptyset$

(b) Explain why Sophie's statement is wrong.

(1)

$D$  is a set such that  $A \cap D = \{18, 26\}$

The set  $D$  has exactly 5 members.

(c) List the members of one possible set  $D$

(2)

# Foundation 2

Here is a rectangle.



(e) Write down the order of rotational symmetry of the rectangle.

1

(f) Change 4.3 litres into millilitres.

(1)

Question	Marks	ALL	5	4	3	2	1
Q05a	1	46%	75%	68%	47%	21%	0%
Q05b	1	89%	95%	92%	93%	79%	80%
Q05c	1	71%	95%	92%	74%	57%	13%
Q05d	1	35%	78%	46%	30%	11%	0%
Q05e	1	39%	70%	59%	37%	19%	0%
Q05f	1	75%	88%	95%	84%	58%	27%
	6	59%	84%	75%	61%	41%	20%



(a) Measure the size of the angle marked  $x$

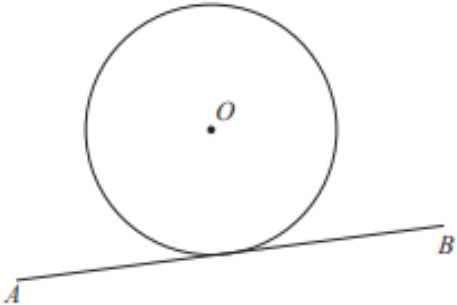
(1)

(b) From the point marked with a cross ( $\times$ ) draw a line of length 8.4 cm

$\times$

(1)

The diagram shows a circle, centre  $O$



(c) On the diagram, draw a radius of the circle.

(1)

(d) Write down the mathematical name for the line  $AB$

# Foundation 2

27 (a) Write  $8.6 \times 10^{-5}$  as an ordinary number.

(b) Work out  $(3 \times 10^{143}) \div (6 \times 10^{137})$

Give your answer in standard form.

Question	Marks	ALL	5	4	3	2	1
Q27a	1	55%	95%	81%	61%	19%	13%
Q27b	2	15%	49%	18%	8%	0%	4%
Total	3	28%	64%	39%	26%	6%	7%

Question	Marks	ALL	5	4	3	2	1
Q14	2	10%	26%	8%	5%	1%	0%

14 The diagram shows the positions of two villages, *A* and *B*

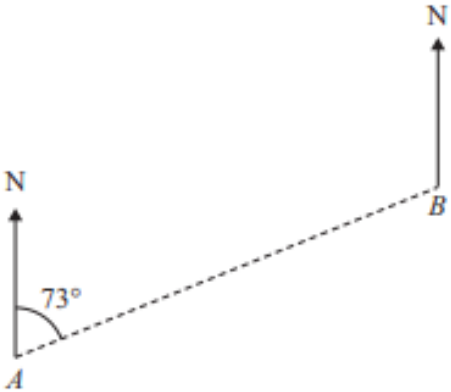


Diagram **NOT** accurately drawn

The bearing of *B* from *A* is 073°

Work out the bearing of *A* from *B*

(Total for Question 14 is 2 marks)

# Foundation 1R and 2R

Qu		Score	Max score	ALL	5	4	3	2	1
Q01	Place value, rounding, addition, writing numbers in words	3.91	5	78%	92%	92%	87%	75%	65%
Q02	Probability (cards, likelihood, probability scale)	1.72	3	57%	80%	87%	67%	55%	22%
Q03	3D shapes, angles, polygons	1.97	3	66%	93%	87%	85%	55%	44%
Q04	Decimals, percentages, fractions	4.31	6	72%	97%	90%	83%	73%	52%
Q05	Coordinates, plotting points	2.29	3	76%	93%	80%	88%	77%	33%
Q06	Algebra: simplifying, solving equations, substitution	5.26	8	66%	100%	93%	87%	53%	33%
Q07	Money, total cost, problem solving	2.31	3	77%	100%	93%	87%	88%	63%
Q08	Angles, reasoning, quadrilaterals	1.41	5	28%	68%	28%	43%	24%	7%
Q09	Two-way tables, probability, complements	3.66	5	73%	92%	88%	82%	71%	51%
Q10	Linear graphs (plotting $y = 2x - 5$ )	1.63	3	54%	100%	100%	63%	45%	0%
Q11	Estimation (significant figures)	0.36	2	18%	70%	50%	18%	0%	0%
Q12	Arithmetic (order of operations)	1.17	2	59%	100%	80%	68%	63%	61%
Q13	Area of circle, practical application	0.61	3	20%	40%	47%	27%	5%	0%
Q14	Perimeter, compound shapes, money	1.26	4	32%	85%	75%	42%	24%	14%
Q15	Percentages (exam scores)	1.57	2	79%	100%	100%	89%	90%	84%
Q16	Venn diagrams, probability	1.38	3	46%	87%	87%	65%	33%	4%
Q17	Bounds (upper/lower), measurement	0.34	2	17%	60%	20%	15%	5%	0%
Q18	Fraction multiplication, showing working	0.96	3	32%	47%	33%	32%	13%	4%
Q19	Probability (spinner, expected value)	1.36	5	27%	88%	72%	37%	13%	9%
Q20	Sets, set notation, symbols	0.94	4	24%	35%	35%	21%	20%	6%
Q21	Indices, arithmetic	2.47	4	62%	95%	80%	70%	68%	22%
Q22	Isosceles triangle, algebraic reasoning	0.34	3	11%	40%	7%	17%	0%	0%
Q23	Speed conversion (m/s to km/h)	0.63	3	21%	47%	53%	33%	27%	22%
Q24	Trigonometry, compound triangles	0.36	4	9%	35%	0%	3%	0%	0%
Q25	Algebra: indices, factorising, solving quadratics	1.54	7	22%	80%	26%	18%	7%	8%
Q26	Pressure, area, force (applied maths)	1.03	5	21%	76%	40%	22%	5%	0%

Qu		Score	Max score	ALL	5	4	3	2	1
Q01	Data handling (pictogram, ratio, activities)	3.9	5	78%	100%	72%	87%	77%	49%
Q02	Statistics (mode, median, range)	2.13	4	53%	70%	85%	66%	25%	17%
Q03	Scales, number lines	1.85	2	93%	100%	100%	94%	93%	89%
Q04	Geometry (circle, rectangle, parallelogram, symmetry)	0.78	4	20%	49%	23%	18%	11%	3%
Q05	Sequences (arithmetic, nth term, explanation)	3.31	4	83%	80%	100%	81%	85%	78%
Q06	Congruence, angle measurement, drawing lines	1.76	3	59%	93%	80%	73%	50%	37%
Q07	Algebra: simplifying, nth term of sequence	1.69	3	56%	93%	80%	59%	47%	52%
Q08	Volume (cuboid packing problem)	1.8	3	60%	100%	100%	67%	40%	26%
Q09	Money, total cost, tax, multi-step calculation	2.3	3	77%	100%	87%	76%	70%	70%
Q10	Scale drawing, distance, time calculation	2.67	5	53%	84%	68%	66%	41%	18%
Q11	Bar chart, points system	2.02	3	67%	87%	100%	76%	65%	22%
Q12	Ratio, scaling (biscuits recipe, money)	3.7	6	62%	100%	87%	75%	53%	13%
Q13	Algebra: substitution, rearranging formula, writing formula	3.48	7	50%	89%	94%	64%	29%	6%
Q14	LCM, time intervals	1.07	3	36%	87%	47%	40%	15%	0%
Q15	Percentages, multi-step percentage bonus calculation	2.89	5	58%	100%	80%	70%	37%	18%
Q16	Statistics (grouped data, modal class, mean estimate)	1.71	5	34%	68%	48%	39%	22%	2%
Q17	Prime factorisation	1.18	3	39%	80%	60%	33%	13%	15%
Q18	Simultaneous equations	0.66	3	22%	60%	60%	22%	15%	0%
Q19	Transformations (rotation, translation)	0.75	4	19%	55%	35%	19%	8%	0%
Q20	Percentage profit (multi-step, tiling problem)	2.32	5	46%	68%	68%	62%	41%	13%
Q21	Standard form (conversion, calculation)	0.8	3	27%	67%	60%	27%	12%	4%
Q22	Mean (combined means problem)	0.42	3	14%	47%	7%	6%	2%	0%
Q23	Reverse percentage (sale price to original price)	0.56	3	19%	60%	27%	18%	5%	7%
Q24	Inequalities, regions (graphing inequalities)	0.63	6	11%	43%	13%	7%	4%	0%
Q25	Angles (regular polygons, multi-step reasoning)	1.1	5	22%	76%	56%	23%	0%	4%

# Foundation 1R

Question	Marks	ALL	5	4	3	2	1
Q02a	1	40%	60%	80%	46%	40%	22%
Q02b	1	68%	80%	100%	73%	65%	33%
Q02c	1	64%	100%	80%	81%	60%	11%
Total	3	57%	80%	87%	67%	55%	22%

- 2 Freya has four cards.  
There is a number on each card.



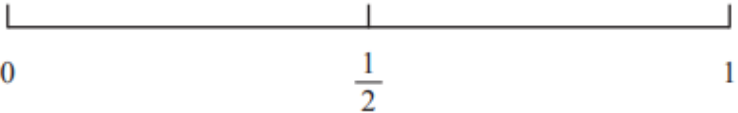
Freya is going to pick at random one of these cards.

- (a) Circle the word in the box below that best describes the likelihood that Freya will pick a card with the number 5 on it.

impossible      unlikely      evens      likely      certain

(1)

- (b) On the probability scale below, mark with a cross (×) the probability that Freya will pick a card with a number less than 6 on it.



(1)

Ishani has six cards each with a number on it.  
Four of these numbers are shown below.

When she picks at random one of the six cards, the probability that she picks a card with an even number on it is  $\frac{1}{2}$

- (c) Write a number on each of the blank cards to show one possible set of six cards that Ishani could have.



(1)

(Total for Question 2 is 3 marks)



# Foundation 1R

8

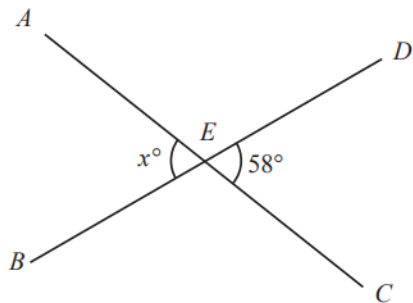


Diagram **NOT**  
accurately drawn

$AEC$  and  $BED$  are straight lines.

Sergio says that the value of  $x$  is 58

(a) Give a reason why Sergio is correct.

(1)

In the diagram,  $GHIJ$  is a quadrilateral.

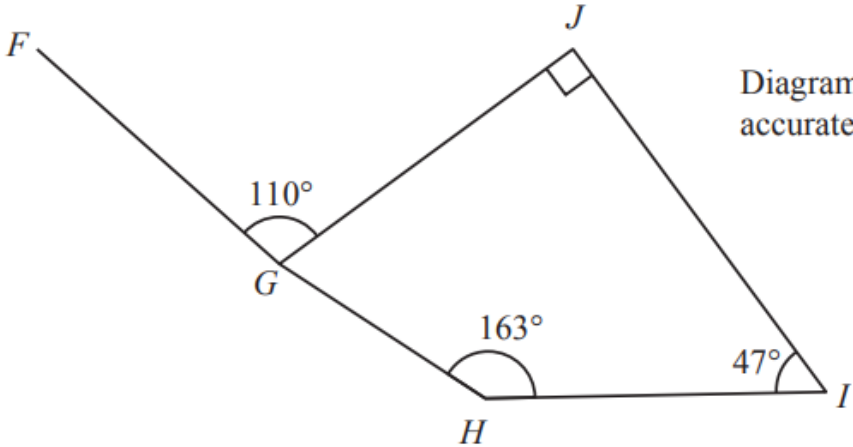


Diagram **NOT**  
accurately drawn

Chloe says “ $FGH$  is a straight line”

(b) Show that Chloe is wrong.  
Give a reason for each stage of your working.

Question	Marks	ALL	5	4	3	2	1
8	5	28%	68%	28%	43%	24%	7%

# Foundation 1R

11 By writing each number correct to one significant figure, work out an estimate for the value of

$$\frac{79 \times 57.9}{1.98}$$

Show your working clearly.

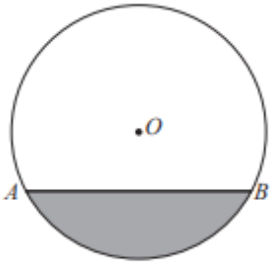
(Total for Question 11 is 2 marks)

Question	Marks	ALL	5	4	3	2	1
Q11	2	18%	70%	50%	18%	0%	0%

# Foundation 2R

Que	Marks	ALL	5	4	3	2	1
Q04ai	1	12%	38%	12%	9%	0%	0%
Q04aii	1	9%	32%	10%	6%	3%	0%
Q04b	1	34%	34%	11%	35%	15%	11%
Q04c	1	22%	22%	36%	21%	15%	0%
Total	4	20%	49%	23%	18%	11%	3%

4  $A$  and  $B$  are points on a circle with centre  $O$



(a) Write down the mathematical name for

(i) the line  $AB$

(1)

(ii) the shaded region

(1)

Here is a rectangle.



(b) On the rectangle, draw the lines of symmetry.

(1)

Here is a parallelogram.



(c) Write down the order of rotational symmetry of the parallelogram.

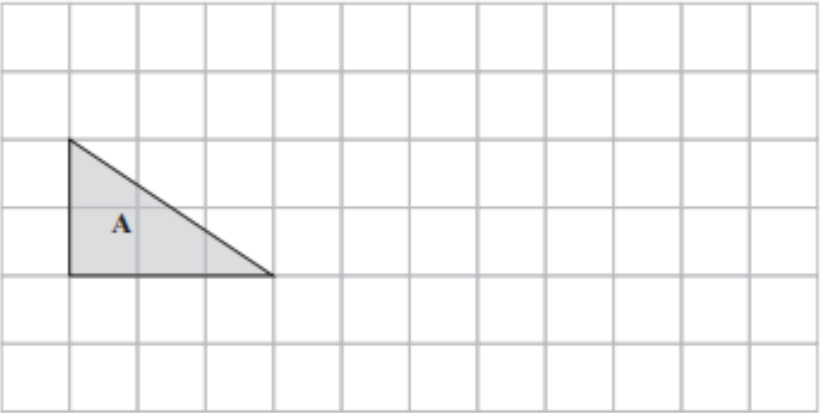
(1)

(Total for Question 4 is 4 marks)

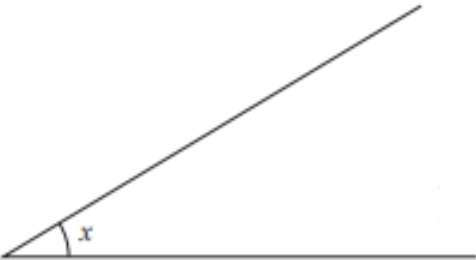
# Foundation 2R

Question	Marks	ALL	5	4	3	2	1
Q06a	1	72%	100%	100%	77%	70%	67%
Q06b	1	52%	100%	60%	73%	25%	22%
Q06c	1	52%	80%	80%	69%	55%	22%
Total	3	59%	93%	80%	73%	50%	37%

6



(a) On the grid, draw a triangle that is congruent to triangle A (1)



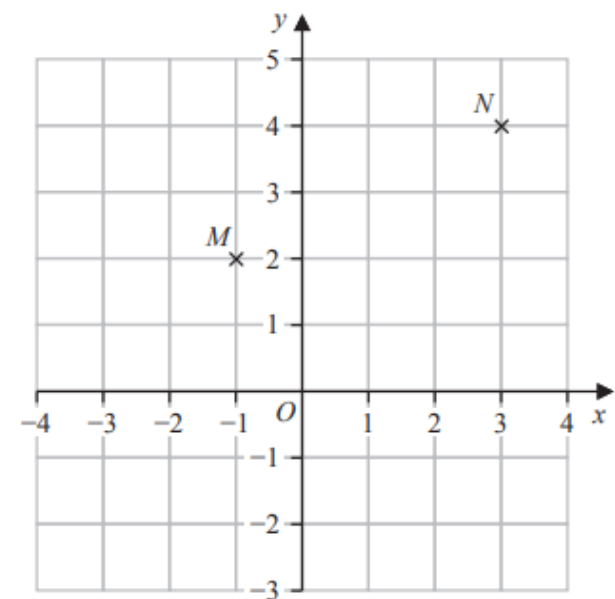
(b) Measure the size of the angle marked x (1)

(c) Draw a line of length 65 millimetres. Start your line at the cross. (1)

(Total for Question 6 is 3 marks)

# Foundation Easy Marks Lost

4 The diagram shows two points,  $M$  and  $N$ , marked on a grid.



(a) Write down the coordinates of point  $M$

( ..... , ..... )  
(1)

(b) Find the coordinates of the midpoint of  $MN$

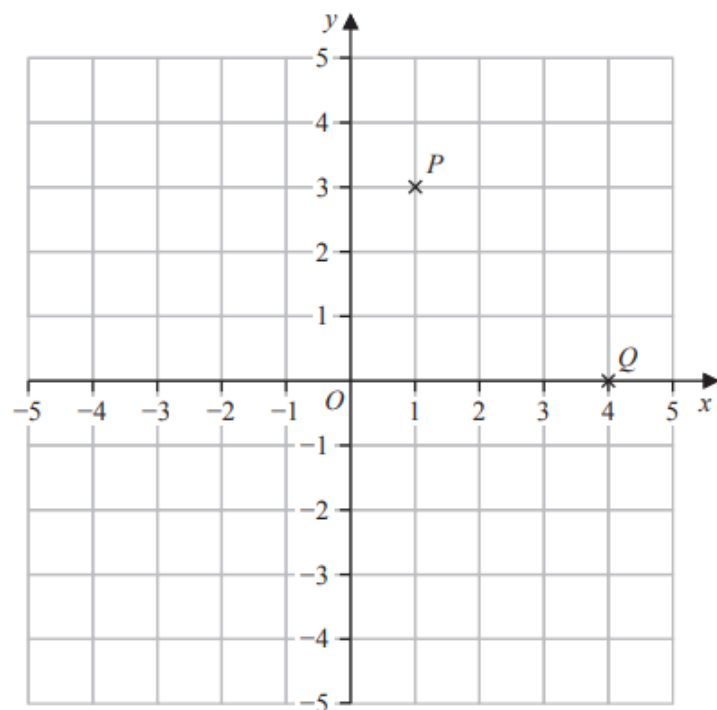
( ..... , ..... )  
(2)

The coordinates of point  $P$  are  $(3, -2)$

(c) On the grid, mark with a cross (x) the position of  $P$   
Label the cross  $P$

(1)

5 The diagram shows points  $P$  and  $Q$  marked on a grid.



(a) Write down the coordinates of point  $P$

(....., .....)  
(1)

(b) Write down the coordinates of point  $Q$

(....., .....)  
(1)

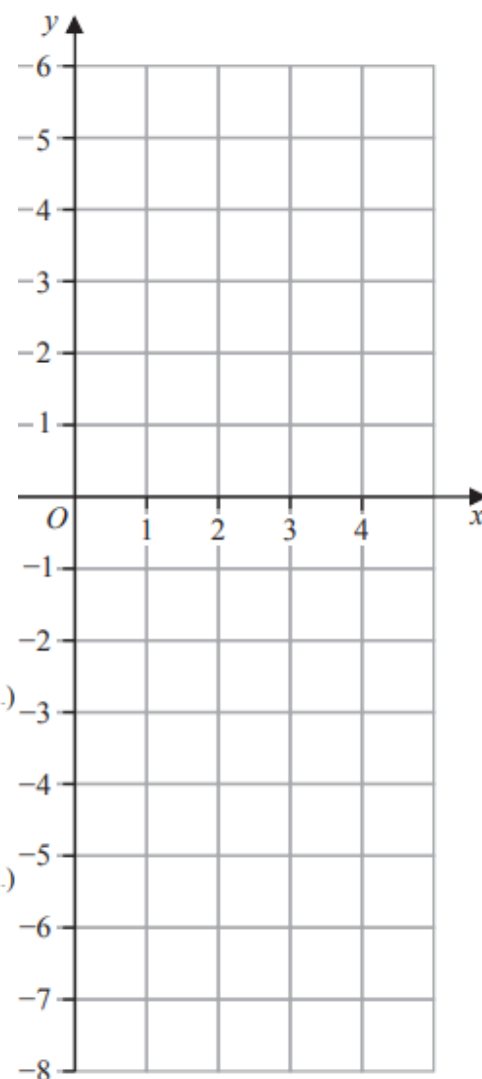
The coordinates of the point  $R$  are  $(-2, -4)$

(c) On the grid, mark with a cross (X) the position of  $R$   
Label this point  $R$

(1)

(Total for Question 5 is 3 marks)

$y = 2x - 5$  for values of  $x$  from  $-1$  to  $4$

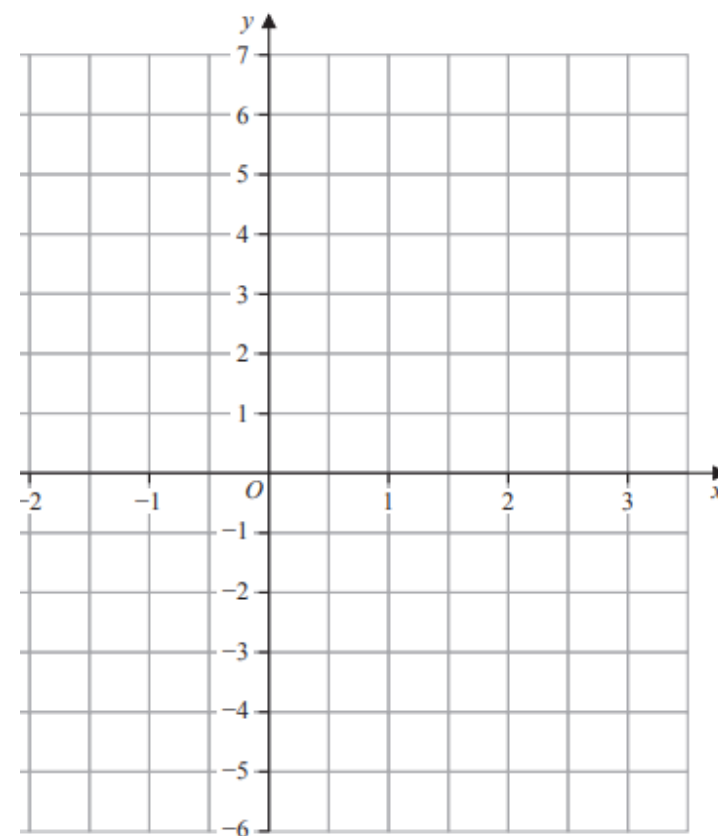


: table of values for  $y = 2x - 1$

$x$	-2	-1	0	1	2	3
$y$			-1			5

(2)

draw the graph of  $y = 2x - 1$  for values of  $x$  from  $-2$  to  $3$



(2)

(Total for Question 8 is 4 marks)



# Higher

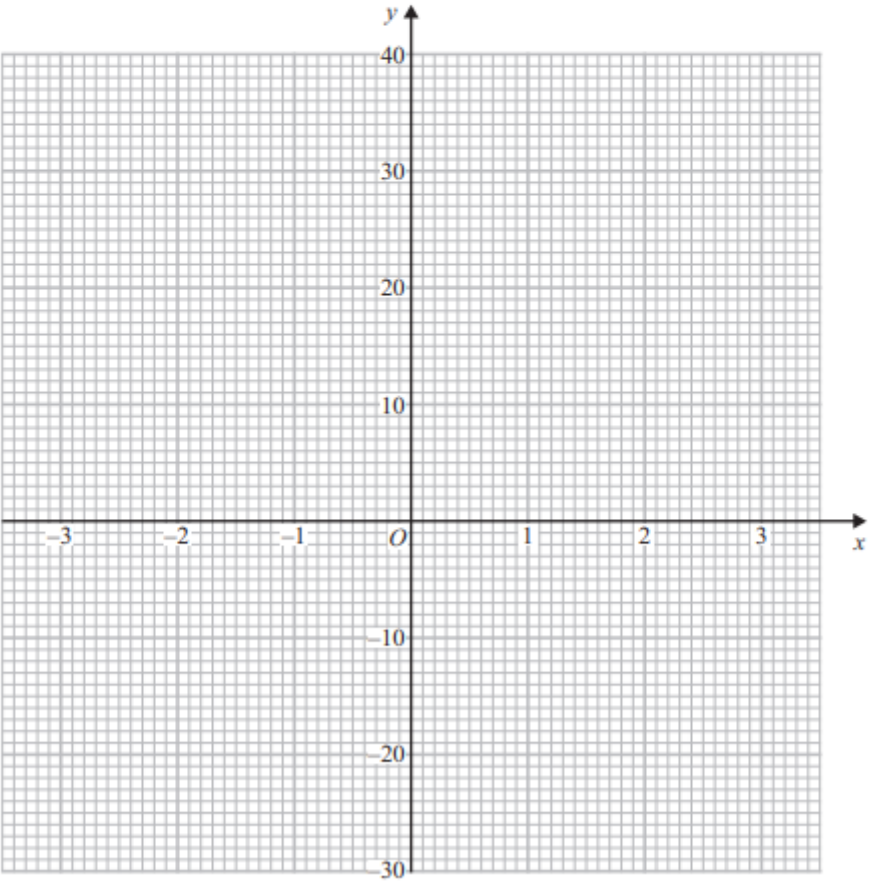
# Easy Marks Lost

13 (a) Complete the table of values for  $y = x^3 + 2x + 3$

$x$	-3	-2	-1	0	1	2	3
$y$		-9	0	3	6		36

(1)

(b) On the grid, draw the graph of  $y = x^3 + 2x + 3$  for  $-3 \leq x \leq 3$



(2)

# Foundation Easy Marks Lost

12 Use your calculator to work out the value of

$$\frac{7.8 + 2.3^2}{5.92 - 4.1}$$

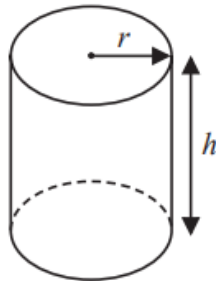
Give your answer as a decimal.

Write down all the figures on your calculator display.

# Foundation Easy Marks Lost

**Volume of cylinder**  $= \pi r^2 h$

**Curved surface area of cylinder**  $= 2\pi r h$



22 The diagram shows triangle  $ABC$  and a semicircle.

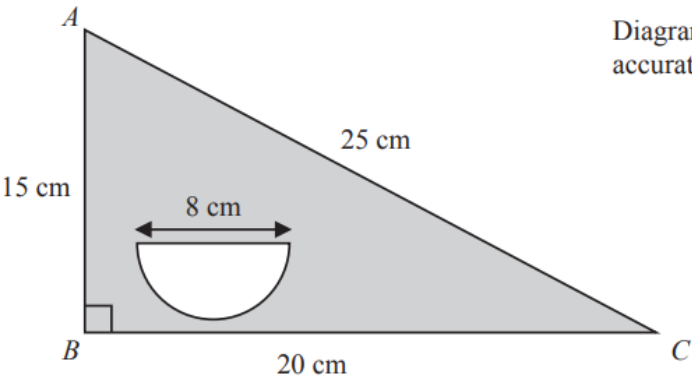


Diagram **NOT**  
accurately drawn

$AB = 15 \text{ cm}$      $BC = 20 \text{ cm}$      $AC = 25 \text{ cm}$     angle  $ABC = 90^\circ$

The diameter of the semicircle is 8 cm

Work out the area of the region shown shaded in the diagram.  
Give your answer correct to 3 significant figures.

13 The diagram shows the plan of a wooden floor in the shape of a circle with radius 6 m

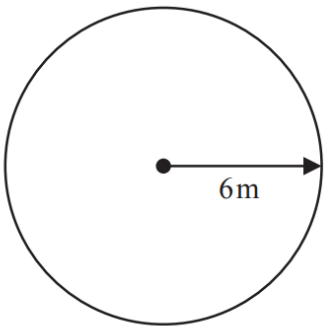


Diagram **NOT**  
accurately drawn

Julia paints the floor.  
Each tin of paint she uses covers an area of  $8 \text{ m}^2$

Julia buys all the paint she needs to cover the floor.

Work out the smallest number of tins of paint that she needs to buy.  
Show your working clearly.

# Foundation

## Easy Marks Lost

17 Write 1400 as a product of powers of its prime factors.  
Show your working clearly.

(Total for Question 17 is 3 marks)

Qu	Marks	ALL	5	4	3	2	1
Q17	3	39%	80%	60%	33%	13%	15%

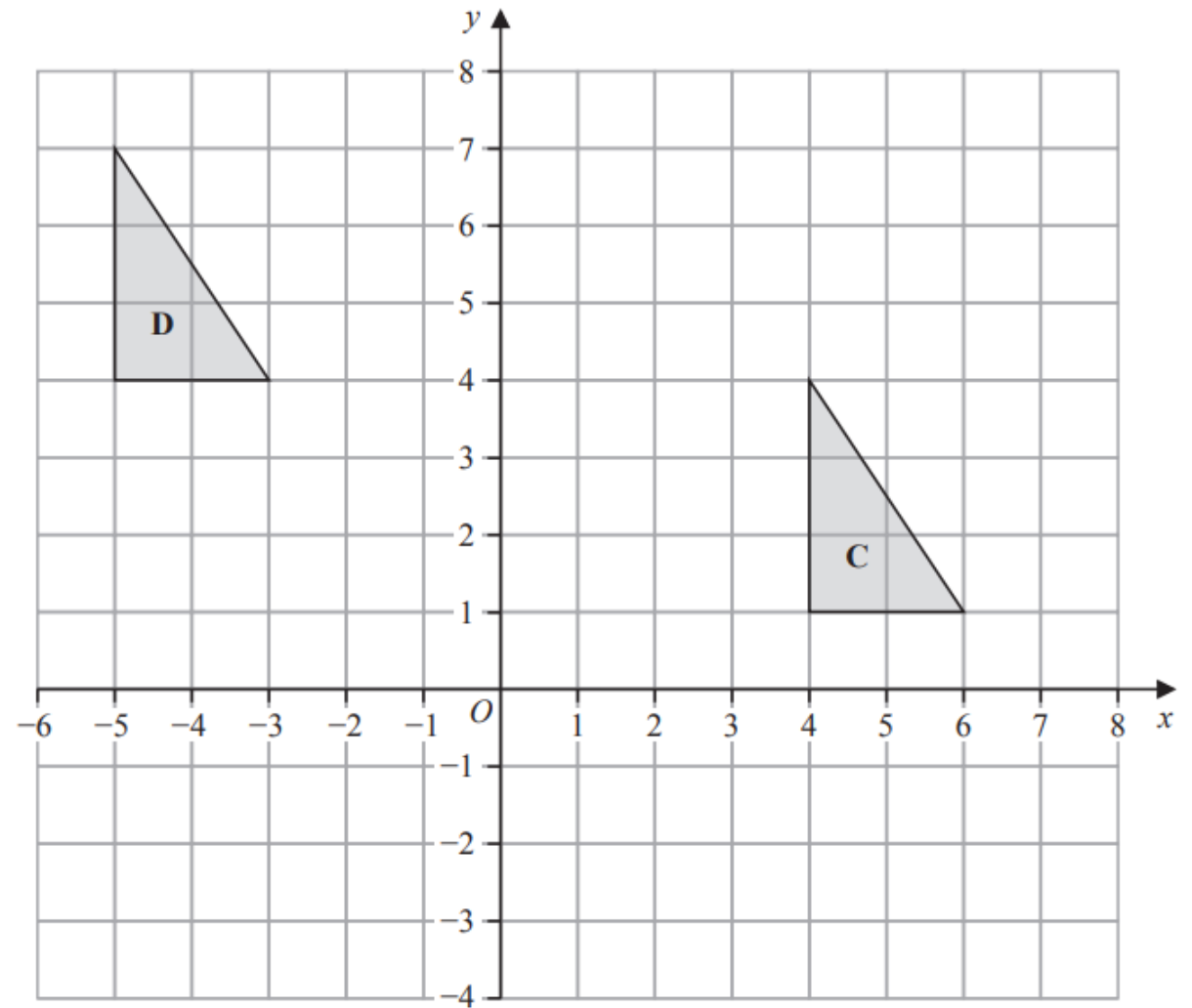
# Foundation Easy Marks Lost

B1 for sight of the vector

$$\begin{pmatrix} -9 \\ 3 \end{pmatrix}$$

Do not accept alternative descriptions that combine two translations, eg left 9, up 3

Allow missing brackets but not  $(-9, 3)$



(b) Describe fully the single transformation that maps triangle C onto triangle D

(2)

# Foundation

## Easy Marks Lost

2 Helena recorded the shoe sizes of seven of her friends.

Here are the results.

2      9      10      6      7      9      4

(a) Write down the mode of the shoe sizes.

(1)

(b) Work out the median shoe size.

(2)

(c) Find the range of the shoe sizes.

(1)

(Total for Question 2 is 4 marks)



## Foundation One to watch

Calvin has a bag of beads.

There are only pink beads and orange beads in the bag.

The ratio

$$\text{number of pink beads} : \text{number of orange beads} = 1 : 4$$

(b) Work out the percentage of the beads in the bag that are pink.

**25** Solve the simultaneous equations

$$3x + 5y = 8$$

$$4x + y = -3.5$$

Show clear algebraic working.

# Summary

# Foundation

## Key Points

Venn diagrams  
Bounds (with higher tier)/rounding  
Measures (angles/lengths  
Coordinates [not (y,x)]  
Calculator (intermediate stage) – see Exam Wizard  
Product of prime factors  
Vector notation  
Time calculations

## Revision

Basic geometric terms/names  
Factorising  
Bearings  
Language of probability  
Circle area/circumference

# Higher

# Higher 1 and 2

Qu		Score	Score	ALL	9	8	7	6	5	4	3
Q01	Fraction multiplication, mixed numbers	2.06	3	69%	90%	80%	72%	65%	56%	47%	33%
Q02	Bounds, estimation	2.78	4	70%	97%	89%	79%	66%	50%	34%	18%
Q03	Probability (expected value, spinner)	3.36	4	84%	100%	99%	96%	90%	76%	55%	35%
Q04	Area (triangle, semicircle, compound region)	2.09	3	70%	96%	91%	82%	68%	52%	32%	16%
Q05	Laws of indices, simplifying expressions	3.76	4	94%	100%	100%	99%	97%	93%	88%	80%
Q06	Pressure, area, force (applied maths)	2.35	3	78%	99%	95%	88%	81%	65%	48%	34%
Q07	Solving equations, factorising quadratics	5.15	6	86%	100%	99%	97%	93%	81%	63%	39%
Q08	Sets, set notation, logic	2.96	5	59%	92%	78%	64%	53%	40%	29%	21%
Q09	Indices, arithmetic	2.72	3	91%	99%	98%	96%	93%	89%	83%	69%
Q10	Area of trapezium, geometry	2.74	5	55%	93%	80%	61%	44%	26%	11%	4%
Q11	Algebra: expanding, simplifying, fractions	4.56	6	76%	96%	93%	88%	79%	65%	47%	28%
Q12	Probability tree, compound probability	3.43	4	86%	100%	99%	96%	89%	77%	60%	43%
Q13	Cubic graph (table of values, plotting)	2.59	3	86%	96%	94%	92%	90%	84%	76%	66%
Q14	Area (sector, triangle with sine rule)	2.9	4	73%	99%	95%	86%	69%	51%	32%	19%
Q15	Quadratic equation (solving, roots)	1.87	3	62%	94%	86%	69%	55%	44%	26%	20%
Q16	Linear equation (solving, roots)	1.59	3	53%	97%	87%	63%	36%	18%	7%	3%
Q17	Surds, rationalising, manipulation	2.36	4	59%	94%	83%	66%	49%	33%	21%	14%
Q18	Histogram, proportion estimation	1.18	3	39%	76%	55%	39%	28%	19%	11%	5%
Q19	Algebraic simplification	0.81	3	27%	63%	41%	25%	16%	9%	3%	1%
Q20	Algebraic manipulation (substitution)	0.93	3	31%	81%	47%	27%	16%	10%	4%	2%
Q21	Sine/Cosine rule, triangle geometry	3.42	5	68%	98%	95%	86%	68%	40%	17%	8%
Q22	Probability (combinatorics, counters)	0.75	3	25%	64%	39%	22%	12%	5%	2%	1%
Q23	3D geometry, trigonometry	0.92	6	15%	53%	20%	8%	3%	1%	1%	0%
Q24	Coordinate geometry (equation of line)	2.16	5	43%	91%	70%	43%	25%	15%	8%	3%
Q25	Completing the square, quadratics	1.25	5	25%	67%	40%	21%	8%	3%	1%	1%

Qu		Score	Score	ALL	9	8	7	6	5	4	3
Q01	Statistics (range, median, mode)	2.49	3	83%	99%	98%	93%	85%	70%	52%	38%
Q02	Surface area (trapezium prism)	1.59	3	53%	91%	73%	55%	40%	26%	13%	8%
Q03	Percentage loss (profit/loss)	2.62	3	87%	98%	95%	91%	88%	81%	73%	66%
Q04	Geometric construction (bisector)	1.42	2	71%	95%	87%	78%	65%	54%	39%	31%
Q05	Sequences (nth term)	1.97	3	66%	94%	85%	73%	57%	41%	28%	21%
Q06	Similar shapes, ratio, proportional reasoning	3.52	4	88%	100%	99%	98%	95%	85%	62%	44%
Q07	Ratio, money sharing, adjustment	2.97	4	74%	95%	87%	79%	72%	63%	50%	38%
Q08	Mean from grouped data	2.37	4	59%	98%	86%	64%	42%	26%	13%	9%
Q09	Compound interest/growth	2.55	3	85%	99%	96%	91%	85%	77%	68%	57%
Q10	Simultaneous equations	2.58	3	86%	99%	97%	95%	89%	82%	65%	45%
Q11	Inequalities, regions	3.38	5	68%	96%	88%	75%	59%	44%	27%	18%
Q12	Standard form	2	3	67%	95%	83%	70%	58%	46%	36%	26%
Q13	Circle geometry (reasoning)	2.04	4	51%	85%	67%	51%	39%	30%	21%	15%
Q14	Cumulative frequency	4.7	6	78%	99%	95%	89%	76%	60%	43%	29%
Q15	Percentage change	1.06	3	35%	81%	48%	28%	18%	12%	7%	4%
Q16	Interquartile range (statistics)	1.38	2	69%	98%	91%	78%	63%	44%	23%	16%
Q17	Prime factorisation, powers	1.97	4	49%	85%	65%	51%	36%	24%	16%	10%
Q18	Proportion (inverse), formula creation	2.23	3	74%	99%	97%	89%	70%	47%	25%	11%
Q19	Rearranging formulae	2.54	4	44%	93%	71%	41%	18%	7%	3%	1%
Q20	Algebraic proof	1.33	3	33%	83%	49%	24%	11%	6%	3%	2%
Q21	Functions (composite, inverse)	2.32	7	48%	89%	70%	49%	28%	15%	7%	2%
Q22	Calculus (gradient of cubict)	1.9	4	48%	89%	70%	49%	28%	15%	7%	2%
Q23	Cuboid, volume, surface area	1.15	3	38%	84%	54%	32%	21%	13%	5%	2%
Q24	Arithmetic series	1.96	4	49%	95%	80%	50%	23%	6%	3%	1%
Q25	Similar solids (volume, ratio)	1.74	4	44%	93%	67%	35%	21%	11%	7%	4%
Q26	Vectors (ratio, straight line)	1.68	5	34%	82%	50%	26%	13%	6%	3%	0%
Q27	Transformations of graphs	2.08	4	52%	94%	80%	56%	30%	15%	6%	3%

# Higher 1

Qu	Marks	ALL	9	8	7	6	5	4	3
Q01	3	69%	90%	80%	72%	65%	56%	47%	33%

Qu	Marks	ALL	9	8	7	6	5	4	3
Q06	3	78%	99%	95%	88%	81%	65%	48%	34%

Answer ALL TWENTY FIVE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Without using a calculator, work out

$$3\frac{2}{3} \times 2\frac{4}{7}$$

Show each stage of your working.  
Give your answer as a mixed number in its simplest form.

6 The diagram shows a block in the shape of a cuboid.

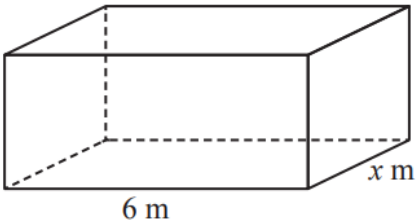


Diagram **NOT**  
accurately drawn

The block has a horizontal base with length 6 m and width  $x$  m

The block is placed on a table so that the whole of its horizontal base is in contact with the table.

The block exerts a force of 702 newtons on the table.  
The pressure on the table due to the block is 65 newtons/m<sup>2</sup>

Work out the value of  $x$

pressure =  $\frac{\text{force}}{\text{area}}$



# Higher 1

Q	Working	Answer	Mark	Notes
1	$\frac{11}{3}(\times)\frac{18}{7}$		3	M1 for both fractions written as improper fractions
	$\frac{11}{3} \times \frac{18}{7} = \frac{198}{21}$ or $\frac{77}{21} \times \frac{54}{21} = \frac{4158}{441}$  $\frac{11}{\cancel{3}^1} \times \frac{\cancel{18}^6}{7} = \frac{66}{7}$ oe			M1 for multiplying the numerators and denominators <b>or</b> cancelling the fractions and then multiplying numerators and denominators
	eg $\frac{11}{3} \times \frac{18}{7} = \frac{198}{21} = \frac{66}{7} = 9\frac{3}{7}$ oe or $\frac{11}{3} \times \frac{18}{7} = \frac{198}{21} = 9\frac{9}{21} = 9\frac{3}{7}$ oe $\frac{11}{\cancel{3}^1} \times \frac{\cancel{18}^6}{7} = \frac{66}{7} = 9\frac{3}{7}$ oe <i>Working required</i>	Correct working leading to correct answer of $9\frac{3}{7}$		A1 Completion to given simplest form. dep on M2  <b>All working must be shown clearly as requested in the question as this is a reasoning question testing working without the use of a calculator</b>
				<b>Total 3 marks</b>

# Higher 1

8  $\mathcal{E} = \{18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$

$A = \{\text{even numbers}\}$

$B = \{\text{multiples of 3}\}$

$C = \{\text{multiples of 5}\}$

(a) List the members of the set  $(A \cup B)'$

(2)

Sophie writes down the statement  $B \cap C = \emptyset$

(b) Explain why Sophie's statement is wrong.

(1)

$D$  is a set such that  $A \cap D = \{18, 26\}$   
The set  $D$  has exactly 5 members.

(c) List the members of one possible set  $D$

Qu	Marks	ALL	9	8	7	6	5	4	3
Q08a	2	59%	91%	76%	63%	52%	41%	28%	19%
Q08b	1	76%	96%	91%	83%	78%	65%	53%	46%
Q08c	2	52%	91%	75%	56%	43%	27%	18%	11%
Total	5	59%	92%	78%	64%	53%	40%	29%	21%

# Higher 1

16 Solve the equation  $8^{3y+4} \times 4^{3y} = 2^{5y}$   
Show your working clearly.

17  $(\sqrt{3})^5 = k\sqrt{3}$  where  $k$  is an integer.

(a) Find the value of  $k$

$k = \dots\dots\dots$   
(1)

(b) Show that  $\frac{21}{3 - \sqrt{2}}$  can be written in the form  $c + \sqrt{d}$

where  $c$  and  $d$  are integers.  
Show each stage of your working clearly.

Qu	Marks	ALL	9	8	7	6	5	4	3
Q16	3	53%	97%	87%	63%	36%	18%	7%	3%
Q17a	1	68%	96%	85%	74%	65%	53%	41%	38%
Q17b	3	56%	93%	82%	64%	44%	26%	14%	6%
Total	4	59%	94%	83%	66%	49%	33%	21%	14%

Higher 2

2 The diagram shows a solid prism with a cross section in the shape of a trapezium.

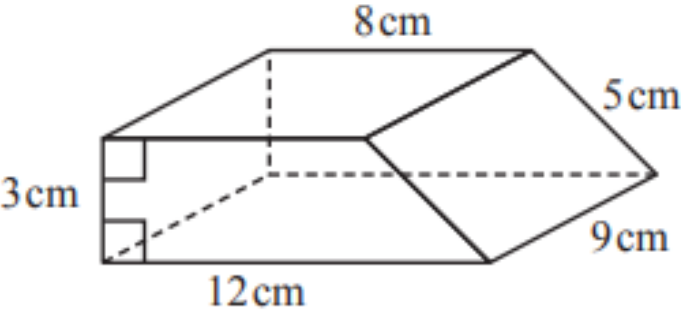


Diagram NOT accurately drawn

Work out the total surface area of the prism.

	Score	Max score	ALL	9	8	7	6	5	4	3
Statistics (range, median, mode, card completion)	2.49	3	83%	99%	98%	93%	85%	70%	52%	38%
Surface area (trapezium prism)	1.59	3	53%	91%	73%	55%	40%	26%	13%	8%
Percentage loss (profit/loss)	2.62	3	87%	98%	95%	91%	88%	81%	73%	66%
Geometric construction (perpendicular bisector)	1.42	2	71%	95%	87%	78%	65%	54%	39%	31%

Qu	Marks	ALL	9	8	7	6	5	4	3
Q02	3	53%	91%	73%	55%	40%	26%	13%	8%

# Higher 2

8 The table gives information about the lengths of time, in minutes, that some people were in a coffee shop.

Length of time ( $m$ minutes)	Frequency
$0 < m \leq 10$	$x$
$10 < m \leq 20$	3
$20 < m \leq 30$	2
$30 < m \leq 40$	4
$40 < m \leq 50$	2

The information in the table is used to calculate an estimate for the mean length of time these people were in the coffee shop.

The estimate for the mean length of time is 20

Work out the value of  $x$

Qu	Marks	ALL	9	8	7	6	5	4	3
Q08	4	59%	98%	86%	64%	42%	26%	13%	9%

# Higher 2

17  $A = 3^2 \times 5^4$        $B = 2^5 \times 3^2$        $C = 2^3 \times 5^6$

(a) Work out the value of  $(ABC)^3$

Give your answer as a product of powers of its prime factors.

(2)

(b) Work out  $(5 \times 10^{150}) \times (3 \times 10^{140})$

Give your answer as a product of powers of its prime factors.

Qu	Marks	ALL	9	8	7	6	5	4	3
Q17a	2	59%	97%	83%	65%	43%	24%	13%	7%
Q17b	2	40%	73%	48%	37%	30%	24%	19%	13%
Total	4	49%	85%	65%	51%	36%	24%	16%	10%

# Higher 2

20  $a, b$  and  $c$  are three consecutive even numbers where  $a < b < c$

Prove algebraically that  $b^2 = ac + 4$

Question	Working	Answer	Mark	Notes
20	3 correct algebraic terms for consecutive even numbers eg $2n, 2n + 2, 2n + 4$ oe or eg $n, n + 2, n + 4$ oe (ie for odd or even numbers) or eg $a = b - 2, c = b + 2$			M1 For 3 consecutive even numbers in algebraic form stated (any letter can be used)  or used $n$ , then proving for even and odd numbers  or using $a, b$ , or $c$
	eg $(ac =) 4n^2 + 8n$ or $(b^2 =) 4n^2 + 8n + 4$ or eg $(ac =) n^2 + 4n$ or or eg $(ac =) b^2 - 2b + 2b - 4$ oe			M1 (dep) Working out $ac$ or $b^2$
	eg $ac + 4 = 4n^2 + 8n + 4$ $b^2 = 4n^2 + 8n + 4$  eg $b^2 = n^2 + 4n + 4$ $b^2 = (n^2 + 4n) + 4 = ac + 4$  eg $b^2 = b^2 - 4 + 4$ oe ( $b$ is defined as even in the question)	Proof		A1 Fully correct proof shown by linking together the two expressions  if used $n, n + 2, n + 4$ oe, then a statement is needed "as it is true for all consecutive odd and even numbers then it is true for all even numbers" oe  if using $a, b$ , or $c$ no statement is needed because they have been defined as even numbers.
				<b>Total 3 marks</b>

for Question 20 is 3 marks)

Qu	Marks	ALL	9	8	7	6	5	4	3
Q20	3	44%	93%	71%	41%	18%	7%	3%	1%

# Higher 1R and 2R

Qu		Score	Score	ALL	9	8	7	6	5	4	3
Q01	Bounds (upper/lower), measurement	1.5	2	75%	98%	94%	81%	72%	62%	48%	25%
Q02	Fraction multiplication	2.11	3	70%	80%	78%	72%	70%	59%	50%	51%
Q03	Probability (spinner, expected value)	3.85	5	77%	97%	94%	94%	85%	75%	56%	35%
Q04	Sets, set notation, symbols	2.57	4	64%	92%	80%	69%	58%	53%	45%	23%
Q05	Laws of indices, arithmetic	3.75	4	94%	100%	99%	99%	98%	97%	95%	90%
Q06	Isosceles triangle, algebraic reasoning	1.89	3	63%	99%	92%	81%	65%	53%	33%	28%
Q07	Speed conversion (m/s to km/h)	1.87	3	62%	95%	82%	67%	58%	49%	37%	36%
Q08	Trigonometry (compound triangles)	2.68	4	67%	97%	94%	89%	76%	46%	21%	7%
Q09	Algebra: indices, factorising, quadratics	5.51	7	79%	99%	97%	93%	86%	75%	57%	31%
Q10	Pressure, area, force (applied maths)	3.79	5	76%	100%	96%	94%	83%	70%	40%	28%
Q11	Probability tree, compound probability	3.12	4	78%	99%	98%	93%	86%	60%	49%	41%
Q12	Solving equations, surds	3.43	6	57%	96%	83%	70%	64%	47%	28%	13%
Q13	Trigonometry	2.47	5	49%	92%	74%	65%	44%	25%	9%	7%
Q14	Recurring decimals (algebraic proof)	1.3	2	65%	92%	88%	73%	61%	49%	27%	4%
Q15	Quadratic equation (solving, roots)	3.81	6	64%	95%	87%	78%	68%	50%	38%	17%
Q16	Surds, rationalising, manipulation	2.1	4	53%	88%	80%	65%	46%	30%	24%	7%
Q17	Probability (counters, sum less than value)	0.59	3	20%	59%	31%	16%	10%	3%	1%	1%
Q18	Completing the square, minimum value	1.54	4	39%	83%	66%	42%	26%	13%	14%	0%
Q19	Geometry (algebraic reasoning)	1.97	5	39%	95%	76%	48%	30%	20%	7%	4%
Q20	3D geometry (cuboid, Pythagoras)	1.88	3	63%	98%	93%	82%	66%	41%	18%	11%
Q21	Histogram, estimation	1.44	3	48%	92%	73%	59%	32%	18%	15%	8%
Q22	Geometry (sector, arc length, area)	0.85	6	14%	66%	18%	5%	0%	1%	1%	1%
Q23	Circle geometry (algebraic reasoning)	0.89	5	18%	72%	31%	9%	4%	3%	0%	0%
Q24	Algebraic fractions (simplifying)	1.16	4	29%	81%	52%	26%	21%	9%	6%	1%

Qu		Score	Score	ALL	9	8	7	6	5	4	3
Q01	Statistics (grouped data)	3.47	5	69%	95%	88%	72%	60%	46%	35%	20%
Q02	Prime factorisation	2.34	3	78%	95%	93%	85%	72%	67%	61%	29%
Q03	Simultaneous equations	2.49	3	83%	99%	97%	93%	87%	72%	55%	25%
Q04	Transformations (rotation, translation)	2.04	4	51%	80%	63%	52%	45%	31%	28%	26%
Q05	Percentage profit (multi-step)	3.33	5	67%	85%	78%	70%	59%	54%	49%	38%
Q06	Standard form (conversion, calculation)	2.49	3	83%	99%	97%	89%	83%	75%	62%	46%
Q07	Mean (combined means problem)	1.88	3	63%	98%	85%	67%	44%	23%	16%	13%
Q08	Reverse percentage	2.14	3	71%	99%	90%	82%	63%	50%	34%	17%
Q09	Inequalities, regions (graphing)	4.26	6	71%	97%	91%	77%	65%	50%	35%	18%
Q10	Angles (regular polygons)	3.9	5	78%	100%	97%	88%	80%	60%	34%	20%
Q11	Cumulative frequency	4.42	7	63%	94%	81%	68%	48%	32%	24%	23%
Q12	Compound depreciation (find rate)	1.99	3	66%	96%	90%	67%	53%	41%	16%	11%
Q13	Standard form, unit conversion	1.63	3	54%	92%	73%	52%	40%	19%	8%	17%
Q14	Rearranging formulae (make subject)	2.28	4	57%	95%	82%	54%	43%	19%	11%	1%
Q15	Circle geometry (angles)	1.42	3	47%	91%	58%	35%	34%	11%	11%	8%
Q16	Vectors (ratio, straight line)	1.67	3	56%	95%	75%	59%	34%	22%	13%	4%
Q17	Functions (domain, inverse)	2.21	4	55%	99%	84%	58%	35%	16%	8%	2%
Q18	Circle geometry ( intersecting chords)	1.38	3	46%	92%	70%	38%	28%	8%	1%	0%
Q19	Calculus (gradient estimation from graph)	0.94	3	31%	78%	40%	20%	9%	3%	1%	1%
Q20	Quadratic inequalities (solving)	1.55	3	52%	89%	64%	51%	42%	27%	16%	3%
Q21	Cuboid, volume, optimisation	1.93	5	39%	84%	47%	30%	16%	11%	8%	2%
Q22	Simultaneous equations (quadratic)	3.19	5	64%	95%	85%	73%	55%	32%	19%	7%
Q23	Trigonometric graphs (parameters)	0.97	3	32%	79%	40%	15%	8%	3%	5%	3%
Q24	Arithmetic series	2.33	6	39%	88%	56%	27%	10%	4%	1%	0%
Q25	Surface area	1.79	5	36%	76%	48%	27%	17%	4%	3%	0%



# Higher 1R

2 Show that  $2\frac{1}{4} \times 1\frac{5}{7} = 3\frac{6}{7}$

(Total for Question 2 is 3 marks)

Qu	Marks	ALL	9	8	7	6	5	4	3
Q02	3	70%	80%	78%	72%	70%	59%	50%	51%

# Higher 1R

Qu	Marks	ALL	9	8	7	6	5	4	3
Q04ai	1	65%	92%	80%	72%	67%	47%	44%	21%
Q04aii	1	75%	96%	92%	80%	74%	71%	61%	33%
Q04bi	1	56%	88%	69%	56%	42%	45%	37%	25%
Q04bii	1	61%	92%	77%	69%	48%	48%	37%	12%
Total	4	64%	92%	80%	69%	58%	53%	45%	23%

4  $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$A = \{2, 4, 6, 8, 10, 12\}$

$B = \{3, 6, 9, 12\}$

$C = \{1, 3, 5, 7, 9, 11\}$

(a) List the members of the set

(i)  $A \cup B$

(ii)  $B'$

(2)

$\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$A = \{2, 4, 6, 8, 10, 12\}$

$B = \{3, 6, 9, 12\}$

$C = \{1, 3, 5, 7, 9, 11\}$

$\mathcal{E}$  $\cap$  $\cup$  $\emptyset$  $\in$  $\notin$

(b) Write a symbol from the box on each dotted line to make each of the following a true statement.

(i)  $A \cap C = \dots\dots\dots$

(ii)  $13 \dots\dots\dots \mathcal{E}$

(2)

(Total for Question 4 is 4 marks)

# Higher 1R

7 Change a speed of 40 metres per second to a speed in kilometres per hour.  
Show your working clearly.

On Saturday, Luisa cycles directly from Harvel to Ebury.

Luisa leaves Harvel at 12 50  
She arrives at Ebury at 17 15

(b) Work out the time Luisa takes to cycle directly from Harvel to Ebury.

4 (a) Write 3 45 pm as a time using the 24-hour clock.

(1)

Shan got on a train at 13 50  
She got off the train at 16 35 the same day.

(b) Work out how long Shan was on the train.  
Give your answer in hours and minutes.

Qu		Score	Max score	ALL	9	8	7	6	5	4	3
Q05	Laws of indices, arithmetic	3.75	4	94%	100%	99%	99%	98%	97%	95%	90%
Q06	Isosceles triangle, algebraic reasoning	1.89	3	63%	99%	92%	81%	65%	53%	33%	28%
Q07	Speed conversion (m/s to km/h)	1.87	3	62%	95%	82%	67%	58%	49%	37%	36%
Q08	Trigonometry (compound triangles)	2.68	4	67%	97%	94%	89%	76%	46%	21%	7%
Q09	Algebra: indices, factorising, solving quadratics	5.51	7	79%	99%	97%	93%	86%	75%	57%	31%
Q10	Pressure, area, force (applied maths)	3.79	5	76%	100%	96%	94%	83%	70%	40%	28%
Q11	Probability tree, compound probability	3.12	4	78%	99%	98%	93%	86%	60%	49%	41%

Qu	Marks	ALL	9	8	7	6	5	4	3
Q07	3	62%	95%	82%	67%	58%	49%	37%	36%

# Higher 1R

12 (a) Solve  $\frac{5a + 8}{3} - \frac{2a + 5}{4} = 23$

Show clear algebraic working.

$a = \dots\dots\dots$

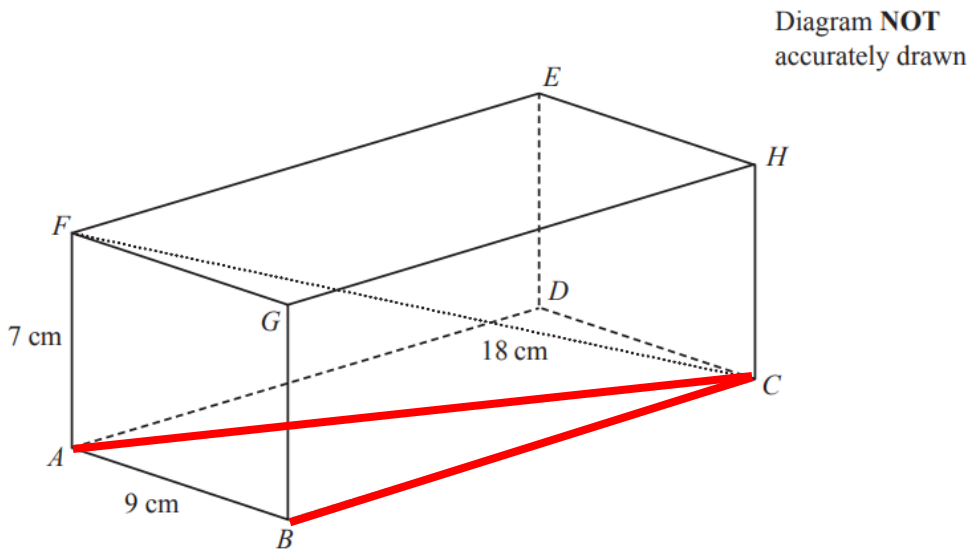
(4)

(b) Express  $\left(\frac{\sqrt{y}}{3}\right)^{-1}$  in the form  $cy^n$  where  $c$  and  $n$  are numbers to be found.

Qu	Marks	ALL	9	8	7	6	5	4	3
O12a	4	65%	99%	93%	82%	77%	59%	35%	19%
Q12b	2	42%	90%	63%	47%	37%	23%	14%	2%
	6	57%	96%	83%	70%	64%	47%	28%	13%

# Higher 2R

20 The diagram shows cuboid  $ABCDEFGH$

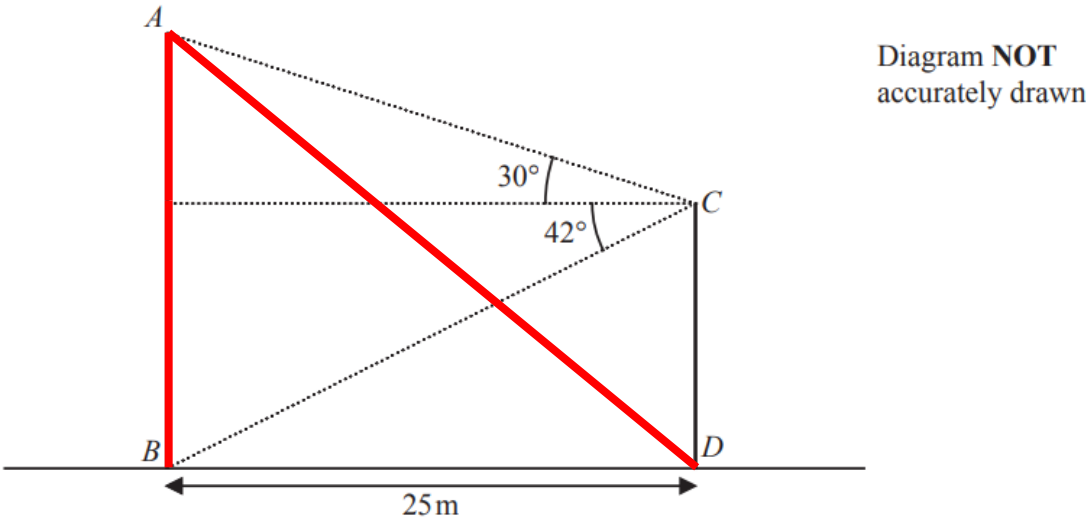


$AB = 9\text{ cm}$      $AF = 7\text{ cm}$      $FC = 18\text{ cm}$

Calculate the length of  $BC$   
Give your answer correct to 3 significant figures.

Qu	Marks	ALL	9	8	7	6	5	4	3
Q20	3	63%	98%	93%	82%	66%	41%	18%	11%

13 In the diagram,  $AB$  represents a vertical tower and  $CD$  represents a vertical building.



The bottom of the tower,  $B$ , and the bottom of the building,  $D$ , are on horizontal ground such that  $BD = 25\text{ m}$

The angle of elevation of  $A$  from  $C$  is  $30^\circ$   
The angle of depression of  $B$  from  $C$  is  $42^\circ$

- (a) Work out the height of the tower  $AB$   
Give your answer correct to one decimal place.
- (b) Work out the angle of elevation of  $A$  from  $D$   
Give your answer correct to one decimal place.

Qu	Marks	ALL	9	8	7	6	5	4	3
Q13a	3	59%	97%	87%	84%	61%	34%	13%	10%
Q13b	2	35%	85%	54%	38%	18%	11%	3%	2%
Total	5	49%	92%	74%	65%	44%	25%	9%	7%

# Higher

## One to watch

20 Given that  $k = m + n$  and  $m = \frac{3}{4n}$

express  $\frac{7k}{5-m}$  in the form  $\frac{a+bn^2}{cn-d}$  where  $a, b$  and  $c$  are integers and  $d$  is prime.

13 The distance from Earth to Andromeda Galaxy is  $1.6 \times 10^{11}$  astronomical units.

- 1 astronomical unit =  $1.5 \times 10^8$  km
- 1 light year =  $9.5 \times 10^{12}$  km

Work out the distance, in light years, from Earth to Andromeda Galaxy.  
Give your answer in standard form, correct to 2 significant figures.

7 (a) Solve  $x - 4 = \frac{3 + 2x}{6}$

Show clear algebraic working.

.....

(b) (i) Factorise  $y^2 - 11y + 30$

$x =$  .....  
(3)

(ii) Hence solve  $y^2 - 11y + 30 = 0$

.....  
(2)

.....  
(1)

# From IAL– one to watch

6.

**In this question you must show all stages of your working.  
Solutions relying on calculator technology are not acceptable.**

The curve  $C_1$  has equation  $y = (x + 5)(3x + 2)(2x - 5)$

The curve  $C_2$  has equation  $y = 3x^2 - 33x - 50$

Use algebra to find the  $x$  coordinates of the points of intersection of  $C_1$  and  $C_2$

**(5)**

Unfortunately, many candidates did not progress from a correct cubic expression to the three roots by non-calculator methods, proceeding to merely list the roots at this point (or indeed, at the quadratic stage) rather than factorising. Some candidates used the quadratic formula, with varying degrees of success. There was a minority of candidates that simply quoted the quadratic formula and then immediately wrote down answers that matched the results from an equation solver facility on their calculator, without actually showing the substitution – these candidates did not score the ddM mark. they had worked back from the calculator solutions.

# Higher One to watch

17 The function  $g$  is defined as

$$g(x) = \frac{3x}{x-2}$$

(a) State the value of  $x$  that cannot be included in any domain of  $g$

---

(1)

(b) Express the inverse function  $g^{-1}$  in the form  $g^{-1}(x) = \dots$



# Higher

## One to watch

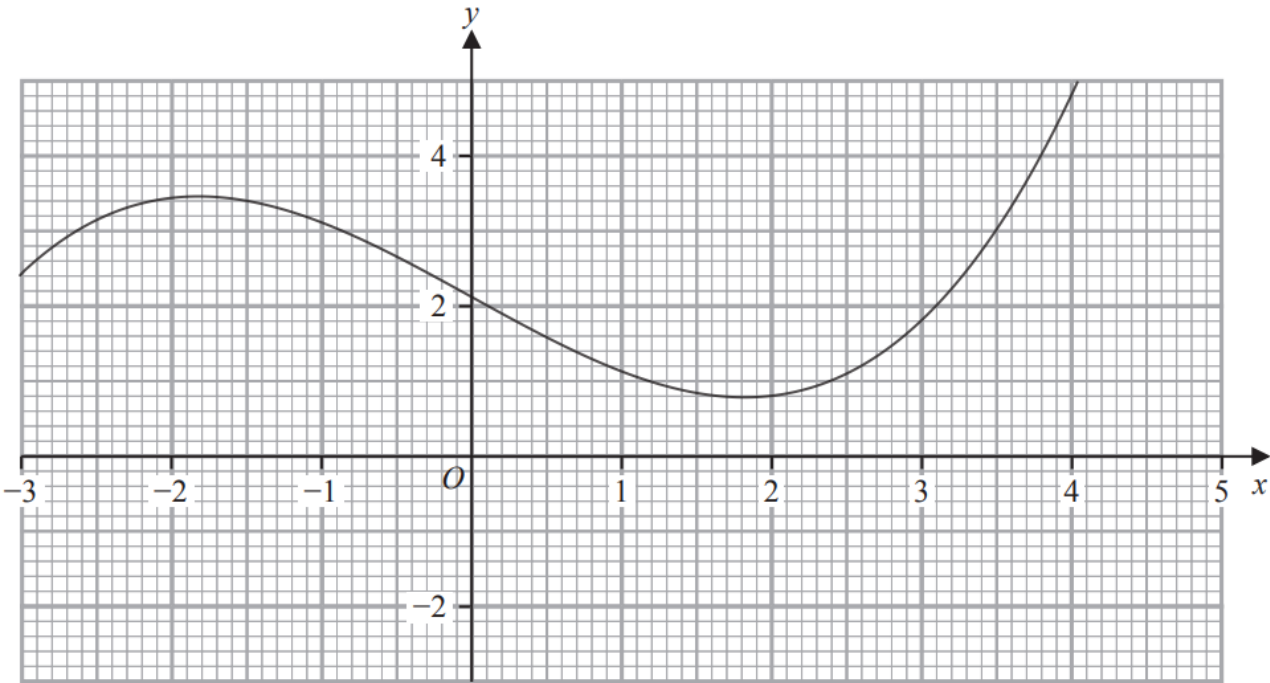
14 Make  $k$  the subject of  $p = \frac{8k^2 + 5}{7 - 3k^2}$

---

**(Total for Question 14 is 4 marks)**

---

19 The diagram shows the graph of  $y = f(x)$



Find an estimate for the gradient of the graph at the point where  $x = 3$   
Show your working clearly.

# Higher One to watch

B1 attempts a tangent line drawn at  $x = 3$   
Be tolerant of poor artwork if the intention is clear

Qu	Marks	ALL	9	8	7	6	5	4	3
Q19	3	31%	78%	40%	20%	9%	3%	1%	1%

# Higher One to watch

21 The diagram shows a solid cuboid.

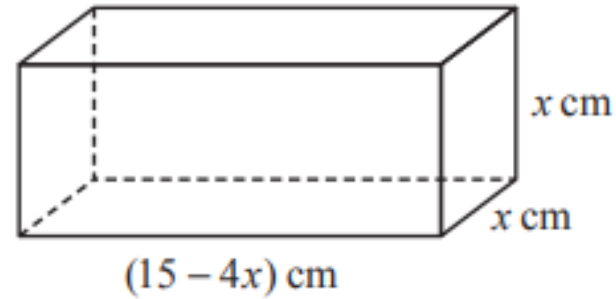


Diagram **NOT**  
accurately drawn

The volume of the cuboid is  $V \text{ cm}^3$

Find the maximum value of  $V$

# Summary

# Higher

## Key Points

Show that – care when you are marking  
Set notation – plenty of practise  
Advanced indices and surds – plenty of practise  
Accuracy of rearrangement – change of subject  
HCF and LCM – check in mocks  
Harder trigonometry – more time in SOW  
Quadratics – calculator use in mocks  
Second derivative – overuse

## Revision

Grouped frequency calcs  
Time and unit conversion/calculations  
Drawing a tangent

# Crossover Data

	Qu	Max	9	8	7	6	5	4	3	2	1
F01	Q19	3					1.72	1.35	0.96	0.55	0.27
F01	Q20	4					2.37	1.29	0.65	0.33	0
F01	Q21	4					3.52	2.43	1.16	0.4	0
F01	Q22	3					2.1	1.27	0.63	0.09	0
F01	Q23	4					2.97	2.73	2.24	1.55	1
F01	Q24	3					2.72	1.92	0.89	0.53	0.33
F01	Q25	6					3.14	1.72	1.15	0.51	0
F01	Q26	5					1.95	1.02	0.76	0.45	0.07
F01	Q27	3					2.67	2.19	1.67	0.72	0.26
F01	Q28	5					2.78	0.68	0.07	0	0
		40					25.94	16.6	10.18	5.13	1.93
	Qu	Max	9	8	7	6	5	4	3	2	1
H01	Q01	3	2.69	2.4	2.16	1.95	1.68	1.42	1		
H01	Q02	4	3.86	3.55	3.14	2.63	1.99	1.37	0.73		
H01	Q03	4	3.99	3.95	3.84	3.58	3.04	2.2	1.38		
H01	Q04	3	2.87	2.72	2.45	2.03	1.57	0.95	0.49		
H01	Q05	4	4	3.98	3.94	3.87	3.72	3.5	3.2		
H01	Q06	3	2.96	2.85	2.65	2.44	1.95	1.45	1.03		
H01	Q07	6	5.98	5.93	5.83	5.57	4.83	3.79	2.33		
H01	Q08	5	4.6	3.92	3.2	2.67	2.01	1.43	1.06		
H01	Q09	3	2.97	2.95	2.89	2.79	2.66	2.49	2.08		
H01	Q10	5	4.65	4	3.05	2.22	1.3	0.53	0.22		
		40	38.57	36.25	33.15	29.75	24.75	19.13	13.52		

# Crossover Data

	Qu	Max	9	8	7	6	5	4	3	2	1
F02	Q16	3					2.6	2.14	1.51	0.74	0.27
F02	Q17	3					1.5	1.14	0.42	0.06	0
F02	Q18	3					2.88	2.46	2.04	1.19	0.93
F02	Q19	2					1.22	0.62	0.51	0.19	0.2
F02	Q20	3					2.57	1.7	1.16	0.39	0.13
F02	Q21	4					3.57	3.13	1.43	0.49	0
F02	Q22	4					3.48	2.73	1.58	0.64	0.07
F02	Q23	4					2.28	0.97	0.4	0.08	0.13
F02	Q24	3					2.72	1.62	1.63	0.81	0.33
F02	Q25	3					2.05	1.22	1.04	0.25	0.07
F02	Q26	5					2.28	0.9	0.64	0.17	0.07
F02	Q27	3					1.93	1.16	0.77	0.19	0.2
		40					29.08	19.79	13.13	5.2	2.4
	Qu	Max	9	8	7	6	5	4	3	2	1
H02	Q01	3	2.97	2.93	2.78	2.55	2.1	1.55	1.14		
H02	Q02	3	2.72	2.18	1.64	1.2	0.77	0.38	0.24		
H02	Q03	3	2.93	2.85	2.74	2.65	2.42	2.2	1.97		
H02	Q04	2	1.9	1.73	1.55	1.3	1.07	0.77	0.62		
H02	Q05	3	2.83	2.54	2.19	1.71	1.24	0.83	0.64		
H02	Q06	4	3.98	3.97	3.92	3.78	3.41	2.49	1.76		
H02	Q07	4	3.78	3.49	3.16	2.89	2.51	2.01	1.5		
H02	Q08	4	3.9	3.42	2.55	1.69	1.02	0.53	0.34		
H02	Q09	3	2.96	2.87	2.72	2.56	2.3	2.05	1.72		
H02	Q10	3	2.97	2.92	2.85	2.66	2.45	1.94	1.34		
H02	Q11	5	4.81	4.41	3.74	2.94	2.19	1.35	0.92		
H02	Q12	3	2.85	2.48	2.09	1.75	1.39	1.07	0.79		
		40	38.6	35.79	31.93	27.68	22.87	17.17	12.98		

# Crossover Data

	Qu	Max	9	8	7	6	5	4	3	2	1
F01R	Q17	2					1.2	0.4	0.3	0.1	0
F01R	Q18	3					1.4	1	0.96	0.4	0.11
F01R	Q19	5					4.4	3.6	1.85	0.65	0.44
F01R	Q20	4					1.4	1.4	0.84	0.8	0.22
F01R	Q21	4					3.8	3.2	2.78	2.7	0.88
F01R	Q22	3					1.2	0.2	0.5	0	0
F01R	Q23	3					1.4	1.6	1	0.8	0.67
F01R	Q24	4					1.4	0	0.12	0	0
F01R	Q25	7					5.6	1.8	1.28	0.5	0.55
F01R	Q26	5					3.8	2	1.12	0.25	0
		40					25.6	15.2	10.75	6.2	2.87
	Qu	Max	9	8	7	6	5	4	3	2	1
H01R	Q01	2	1.96	1.87	1.62	1.43	1.23	0.95	0.5		
H01R	Q02	3	2.41	2.34	2.16	2.09	1.76	1.51	1.54		
H01R	Q03	5	4.85	4.72	4.7	4.25	3.77	2.78	1.75		
H01R	Q04	4	3.68	3.18	2.77	2.31	2.11	1.79	0.91		
H01R	Q05	4	3.98	3.94	3.96	3.91	3.86	3.79	3.58		
H01R	Q06	3	2.98	2.77	2.42	1.96	1.59	1	0.83		
H01R	Q07	3	2.85	2.46	2	1.73	1.47	1.12	1.08		
H01R	Q08	4	3.89	3.75	3.56	3.05	1.85	0.85	0.29		
H01R	Q09	7	6.93	6.79	6.48	6.04	5.22	4.02	2.16		
H01R	Q10	5	4.98	4.82	4.72	4.15	3.48	2.01	1.38		
			38.51	36.64	34.39	30.92	26.34	19.82	14.02		



# Crossover Data

	Qu	Max	9	8	7	6	5	4	3	2	1
F02R	Q16	5					3.4	2.4	1.96	1.1	0.11
F02R	Q17	3					2.4	1.8	1	0.4	0.44
F02R	Q18	3					1.8	1.8	0.65	0.45	0
F02R	Q19	4					2.2	1.4	0.77	0.3	0
F02R	Q20	5					3.4	3.4	3.08	2.05	0.67
F02R	Q21	3					2	1.8	0.81	0.35	0.11
F02R	Q22	3					1.4	0.2	0.19	0.05	0
F02R	Q23	3					1.8	0.8	0.54	0.15	0.22
F02R	Q24	6					2.6	0.8	0.42	0.25	0
F02R	Q25	5					3.8	2.8	1.15	0	0.22
		40					24.8	17.2	10.57	5.1	1.77

	Qu	Max	9	8	7	6	5	4	3	2	1
H02R	Q01	5	4.73	4.4	3.59	3.01	2.29	1.74	1		
H02R	Q02	3	2.86	2.8	2.54	2.17	2	1.84	0.88		
H02R	Q03	3	2.98	2.92	2.79	2.62	2.15	1.64	0.75		
H02R	Q04	4	3.2	2.5	2.07	1.8	1.22	1.12	1.04		
H02R	Q05	5	4.24	3.92	3.48	2.93	2.68	2.45	1.88		
H02R	Q06	3	2.96	2.9	2.67	2.49	2.25	1.85	1.37		
H02R	Q07	3	2.95	2.56	2.01	1.33	0.68	0.47	0.38		
H02R	Q08	3	2.96	2.71	2.46	1.88	1.51	1.03	0.5		
H02R	Q09	6	5.8	5.44	4.64	3.91	2.99	2.07	1.05		
H02R	Q10	5	4.99	4.83	4.41	3.98	3	1.71	1		
		40	37.67	34.98	30.66	26.12	20.77	15.92	9.85		



# Results Plus Data Insights



# Results Plus

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<b>All Edexcel</b> 4MA1 GCSE Unit: MATHEMATICS A June 2024					<a href="#">Print</a> <a href="#">Export</a>
<a href="#">Analysis</a> <a href="#">Highlight report</a> <a href="#">Skills map</a> <a href="#">Exam documents</a>					
Paper: <span>Paper 1F - WRITTEN PAPER 1F</span> <a href="#">View paper</a> Skills map: <span>igcse 9-1 maths a - foundation</span>					
Question ↑	Score ↕	Performance ↕	Edexcel Ave : ALL <a href="#">Edit</a> ↕	Variance ↕	Skill tested
Integers					
Q01a	0.94/1	<div><div></div></div>	0.94/1	-	①
Q01b	0.96/1	<div><div></div></div>	0.96/1	-	①
Q01c	0.95/1	<div><div></div></div>	0.95/1	-	①
Q01d	0.80/1	<div><div></div></div>	0.8/1	-	①
Q01e	0.88/1	<div><div></div></div>	0.88/1	-	①
Q02a	0.80/1	<div><div></div></div>	0.8/1	-	①
Q02b	0.90/1	<div><div></div></div>	0.9/1	-	①
Q02c	0.79/1	<div><div></div></div>	0.79/1	-	①
Q03a	0.90/1	<div><div></div></div>	0.9/1	-	①
Q03b	0.96/1	<div><div></div></div>	0.96/1	-	①
Q03c	0.40/1	<div><div></div></div>	0.4/1	-	①
Q04a	0.75/1	<div><div></div></div>	0.75/1	-	①
Q04b	0.87/1	<div><div></div></div>	0.87/1	-	①
Q04c	0.80/1	<div><div></div></div>	0.8/1	-	①
Q04d	0.70/1	<div><div></div></div>	0.7/1	-	①

# Results Plus

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4MA1 GCSE Unit: MATHEMATICS A  
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Skills map: igcse 9-1 maths a - foundation

Question	Score	Performance	Edexcel Ave : ALL	Variance	Skill tested
			<a href="#">Edit</a>		Integers
Q01a	0.94/1	<div></div>	0.94/1	-	①
Q01b	0.96/1	<div></div>	0.96/1	-	①
Q01c	0.95/1	<div></div>	0.95/1	-	①
Q01d	0.80/1	<div></div>	0.8/1	-	①
Q01e	0.88/1	<div></div>	0.88/1	-	①
Q02a	0.80/1	<div></div>	0.8/1	-	①
Q02b	0.90/1	<div></div>	0.9/1	-	①
Q02c	0.79/1	<div></div>	0.79/1	-	①
Q03a	0.90/1	<div></div>	0.9/1	-	①
Q03b	0.96/1	<div></div>	0.96/1	-	①
Q03c	0.40/1	<div></div>	0.4/1	-	①
Q04a	0.75/1	<div></div>	0.75/1	-	①
Q04b	0.87/1	<div></div>	0.87/1	-	①
Q04c	0.80/1	<div></div>	0.8/1	-	①
Q04d	0.70/1	<div></div>	0.7/1	-	①

# Results Plus

										Analysis	Highlight report				Skills map		Exam documents			
▲	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	
1	Unit analysis export																			
2																				
3	Centre group question averages-All Edexcel-June 2024																			
4	Jun-24																			
5																				
6	Cohort average scores																			
7	Paper																			
8	1F WRITTEN PAPER 1F																			
9																				
10	Question	Skill teste	Skill ID	Score	Max score	Percent	Edexcel av	ALL	1	2	3	4	5	6	7	8	9	ALL	U	
11	Q01a	Integers	N3S50946	0.94	1	94		0.94	0.92	0.93	0.94	0.95	0.96					0.94	0.8	
12	Q01b	Integers	N3S50946	0.96	1	96		0.96	0.9	0.95	0.97	0.98	0.98					0.96	0.75	
13	Q01c	Integers	N3S50946	0.95	1	95		0.95	0.83	0.94	0.97	0.98	0.99					0.95	0.49	
14	Q01d	Integers	N3S50946	0.8	1	80		0.8	0.65	0.74	0.81	0.84	0.87					0.8	0.4	
15	Q01e	Integers	N3S50946	0.88	1	88		0.88	0.61	0.81	0.92	0.95	0.97					0.88	0.31	
16	Q02a	Algebraic	N16S5094	0.8	1	80		0.8	0.61	0.72	0.82	0.86	0.91					0.8	0.4	
17	Q26	Trigonom	N36S5094	0.68	4	17		0.68		0.03	0.18	0.81	2.26					0.68		
18	Q25c	Use of syn	N15S5094	0.5	2	25		0.5	0.06	0.17	0.37	0.63	1.1					0.5	0.01	
19	Q25b	Use of syn	N15S5094	0.64	1	64		0.64	0.25	0.43	0.63	0.77	0.92					0.64	0.08	
20	Q25a	Use of syn	N15S5094	0.31	1	31		0.31	0.1	0.16	0.26	0.37	0.59					0.31	0.03	
21	Q24b	Standard f	N11S5094	0.91	2	45.5		0.91	0.16	0.43	0.84	1.2	1.54					0.91	0.04	
22	Q24a	Standard f	N11S5094	0.83	1	83		0.83	0.46	0.76	0.88	0.93	0.96					0.83	0.12	
23	Q23	Measures	N32S5094	0.56	3	18.66667		0.56	0.06	0.19	0.43	0.71	1.22					0.56	0.02	
24	Q22c	Set langua	N7S50946	0.32	2	16		0.32	0.02	0.08	0.21	0.39	0.79					0.32		
25	Q22b	Set langua	N7S50946	0.36	1	36		0.36	0.07	0.17	0.32	0.46	0.67					0.36	0.01	
26	Q22aii	Set langua	N7S50946	0.13	1	13		0.13	0.01	0.03	0.07	0.17	0.36					0.13		
27	Q22ai	Set langua	N7S50946	0.33	1	33		0.33	0.08	0.21	0.31	0.41	0.53					0.33	0.01	
28	Q21b	Linear equ	N18S5094	0.52	3	17.33333		0.52	0.03	0.11	0.25	0.6	1.51					0.52		
29	Q21a	Algebraic	N16S5094	0.88	2	44		0.88	0.11	0.35	0.74	1.2	1.66					0.88	0.01	
30	Q20	Polygons	N30S5094	1.19	4	29.75		1.19	0.11	0.26	0.69	1.61	2.91					1.19	0.01	
31	Q19	Percentag	N8S50946	0.36	3	12		0.36	0.01	0.06	0.18	0.41	1.06					0.36		
32	Q18	Powers ar	N6S50946	1.06	2	53		1.06	0.27	0.65	1.01	1.35	1.62					1.06	0.06	
33	Q17	Probabilit	N46S5094	1.82	4	45.5		1.82	0.12	0.55	1.59	2.65	3.34					1.82		
34	Q16b	Sequence	N24S5094	0.43	1	43		0.43	0.04	0.14	0.36	0.59	0.82					0.43	0.01	
35	Q16a	Sequence	N24S5094	0.81	2	40.5		0.81	0.13	0.38	0.69	1.05	1.5					0.81	0.01	
36	Q15	Mensurati	N37S5094	1.62	4	40.5		1.62	0.2	0.5	1.24	2.23	3.33					1.62	0.02	
37	Q14b	Percentag	N8S50946	2.03	3	67.66667		2.03	0.35	1.16	2.15	2.65	2.87					2.03	0.03	
38	Q14a	Percentag	N8S50946	0.94	2	47		0.94	0.22	0.46	0.84	1.23	1.6					0.94	0.04	
39	Q13	Graphs	N26S5094	1.85	3	61.66667		1.85	0.28	0.95	1.86	2.48	2.83					1.85	0.01	
40	Q12b	Probabilit	N46S5094	0.8	1	80		0.8	0.34	0.63	0.86	0.95	0.97					0.8	0.08	
41	Q12a	Statistical	N45S5094	1.2	3	40		1.2	0.14	0.45	0.99	1.65	2.27					1.2	0.01	
42	Q11	Ratio and	N9S50946	2.36	4	59		2.36	0.65	1.67	2.49	2.87	3.22					2.36	0.12	
43	Q10b	Probabilit	N46S5094	1.7	2	85		1.7	0.99	1.52	1.81	1.88	1.93					1.7	0.33	
44	Q10a	Probabilit	N46S5094	0.87	1	87		0.87	0.53	0.8	0.93	0.96	0.98					0.87	0.19	
45	Q09	Construct	N33S5094	0.97	2	48.5		0.97	0.28	0.61	0.99	1.18	1.47					0.97	0.03	

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Resources

(a) Simplify  $n^0$

(1)

(b) Simplify  $(3x^2y^3)^3$

(2)

(c) Factorise fully  $2e^2 - 18$

(2)

(d) Make  $r$  the subject of  $m = \sqrt{\frac{6a + r}{5r}}$

(2)

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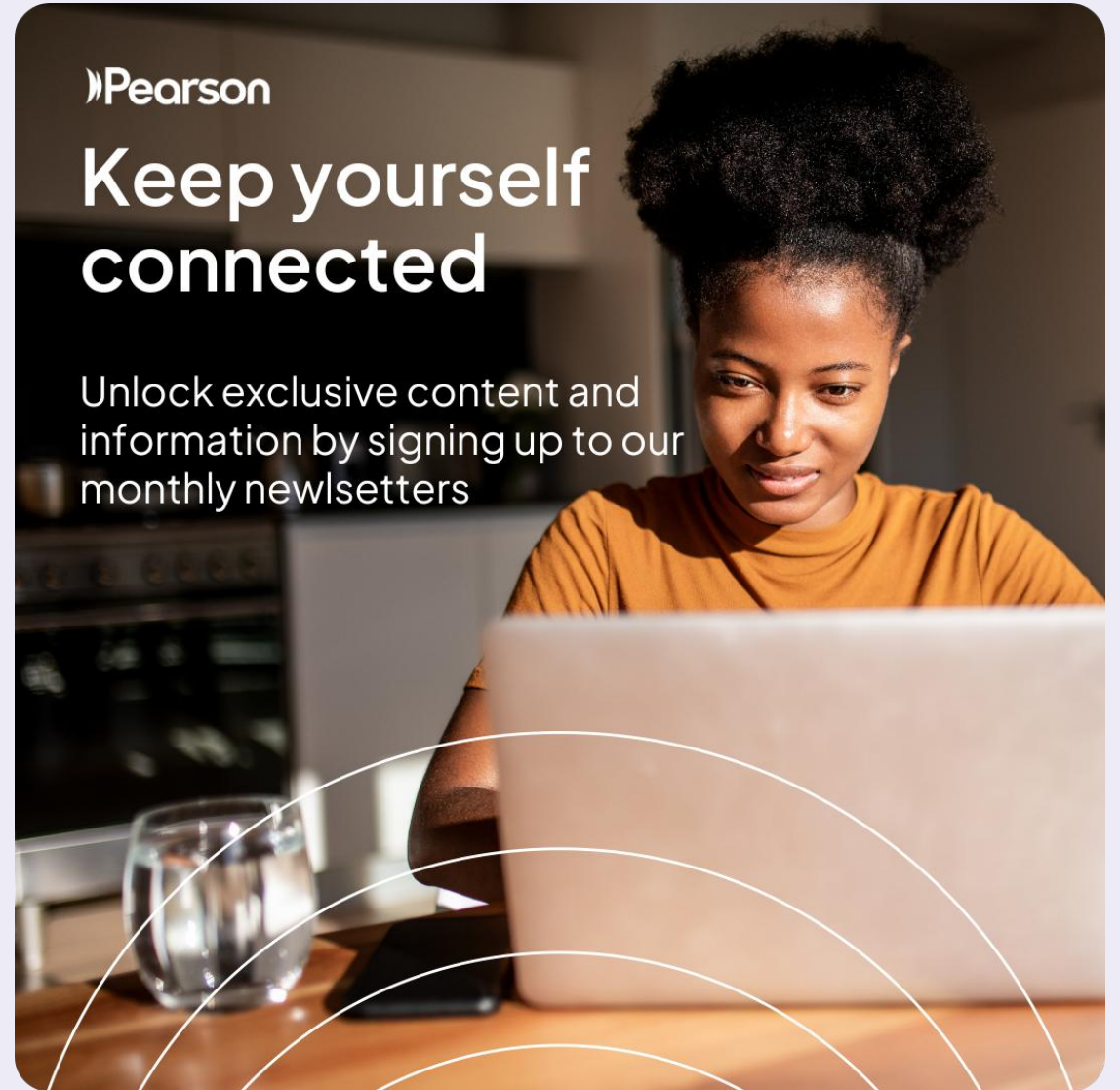




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