Day 215 **IGCSE 10-a-day**

1 A and B are points on the curve $y = 3x^2 + 6x - 2$.
The x coordinate of A is 1 and the x coordinate of B is 4.
Work out the gradient of the line AB.

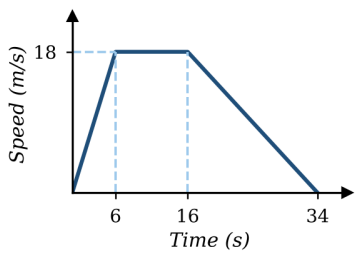
2 Triangle ABC has AB = 12 cm and BC = 9 cm.
The area of triangle ABC is $27\sqrt{3}$ cm^2.
Angle ABC is acute.
Work out the size of angle ABC.
Do not use a calculator.

3 The table shows the number of students in each of four groups.
(a) A stratified sample of 37 is taken. Work out how many come from Year 7.
(b) A different stratified sample has 33 from Year 9. Work out the size of this sample.

	Year 7	Year 8	Year 9	Year 10
Number	300	150	275	200

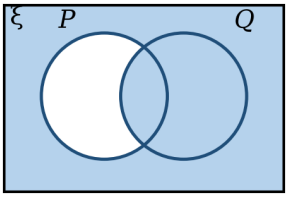
4 A cylinder has radius r cm and fixed height 3 cm. Its volume is $V = 3\pi r^2$ cm^3.
(a) Find $\frac{dV}{dr}$ when r = 7.
(b) Find the value of r when $\frac{dV}{dr} = 54\pi$.

5 The graph shows the speed of a train between two stations.
(a) Work out the acceleration in the first 6 seconds.
(b) Work out the total distance.



Day 215	IGCSE 10-a-day

6 Write down the set notation for the region shaded in the Venn diagram.



7 In one country, income tax is worked out like this:
The first £12,500 of income is not taxed.
The next £35,000 is taxed at 20%.
All income above that is taxed at 40%.
Ravi pays £13,400 in income tax in a year.
Work out Ravi's income for the year.

8 $y = -2x^3 - 9x^2 - 12x + 1$
Use the second derivative to show that the curve has a maximum at $x = -1$.

9 The nth term of a sequence is $2n^2 + 2n - 4$.
(a) Work out the 7th term.
(b) One term of the sequence is 416. Work out the value of n for this term.

10 An open tray has a square base of side x cm and height h cm. The total outside surface area is 48 cm^2.
(a) Show that the volume of the box is $V = \frac{1}{4}(48x - x^3)$ cm^3.
(b) Find the maximum volume of the box, proving that it is a maximum.