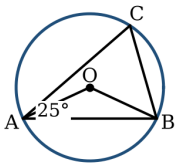
Day 235 **S Tier 10-a-day**

1 Factorise $3x^2 - 19x + 6$

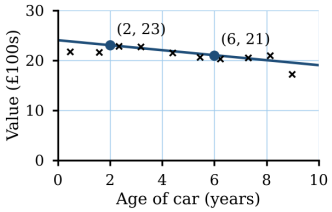
2 A, B and C are points on a circle, centre O.
Angle OAB = 25°.
(a) Work out the size of angle AOB.
(b) Work out the size of angle ACB.
The diagram is not drawn accurately.



3 A bag contains balloons.
$\frac{2}{5}$ of the balloons are pink and $\frac{3}{8}$ of the balloons are silver.
The rest of the balloons, 9 of them, are gold.
How many pink balloons are there?

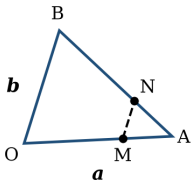
4 The curve $y = x^2 - 8x - 9$ crosses the x-axis at the points A and B.
(a) Find the coordinates of A and B.
(b) Find the coordinates of the minimum point of the curve.

5 The scatter graph shows age of car (x) and value (y).
The equation of the line of best fit is $y = -0.5x + 24$.
(a) Estimate y when x = 3.
(b) Explain why an estimate of y when x = 25 may be unreliable.



Day 235 **S Tier 10-a-day**

6 OAB is a triangle. OA = **a** and OB = **b**.
M is on OA with OM : MA = 2 : 1. N is on AB with AN : NB = 1 : 2.
(a) Find ON in terms of **a** and **b**.
(b) Find MN in terms of **a** and **b**.
The diagram is not drawn accurately.



7 An alloy contains 113 g of lead and 284 g of zinc.
The density of lead is 11.3 g/cm^3. The density of zinc is 7.1 g/cm^3.
Work out the density of the alloy.

8 OA = **a** and OB = **b**.
OP = $-3\mathbf{a} - 2\mathbf{b}$, OQ = $-5\mathbf{a} + 8\mathbf{b}$ and OR = $-8\mathbf{a} + 23\mathbf{b}$.
(a) Show that P, Q and R lie on a straight line.
(b) Work out the ratio PQ : QR in its simplest form.

9 Show that the equation $x^2 + 2kx - 1 = 0$ has two distinct real solutions for all values of k.

10 Given that $(a + \sqrt{15})(b + \sqrt{15}) = 21 + 5\sqrt{15}$, where a and b are positive integers with a < b, find the values of a and b.