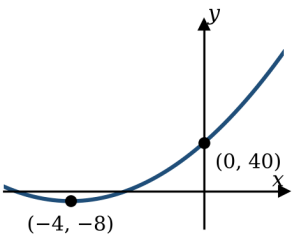
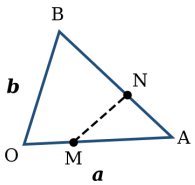
Day 354 **S Tier 10-a-day**

1 The diagram shows a sketch of a quadratic curve with a turning point at $(-4, -8)$.
The curve crosses the y-axis at (0, 40).
Find an equation of the curve.
Give your answer in the form $y = ax^2 + bx + c$.



2 The ratio of juniors to seniors in a school is 4 : 1.
65% of the juniors and 30% of the seniors play a sport.
What percentage of all of these students play a sport?

3 OAB is a triangle. OA = **a** and OB = **b**.
M is on OA with OM : MA = 1 : 2. N is on AB with AN : NB = 2 : 3.
(a) Find ON in terms of **a** and **b**.
(b) Find MN in terms of **a** and **b**.
The diagram is not drawn accurately.



4 a = 6.1 and b = 4,
both correct to 1 decimal place.
Work out the lower bound of a × b.

5 $\mathbf{a} = \begin{pmatrix}1\\5\end{pmatrix}$, $\mathbf{b} = \begin{pmatrix}2\\-2\end{pmatrix}$ and $\mathbf{c} = \begin{pmatrix}5\\1\end{pmatrix}$
$\mathbf{a} + k\mathbf{b}$ is parallel to $\mathbf{c}$.
Work out the value of k.

Day 354	S Tier 10-a-day
6 In a group of employees, 30% are men and the rest are women. 25% of the men and 15% of the women work from home. What percentage of all the employees work from home?	
7 Jamal and Zane play a match. The first to win 2 table tennis games wins the match. The probability that Jamal wins any one of the table tennis games is $\frac{3}{5}$. Work out the probability that the match needs a third one to decide it.	
8 Make r the subject of $P = \frac{4r + 1}{r - 4}$	
9 In one country, income tax is worked out like this: The first £15,000 of income is not taxed. The next £37,500 is taxed at 20%. All income above that is taxed at 40%. Amir pays £14,100 in income tax in a year. Work out Amir's income for the year.	
10 In a population of 10,000 people, 2% have a certain disease. A test gives a positive result for 98% of people who have the disease and for 2% of people who do not. A person is chosen at random and tests positive. Work out the probability that they have the disease.	