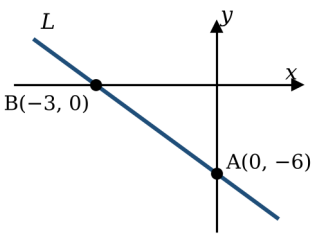
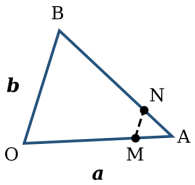
Day 57	S Tier 10-a-day
1 50 deer in a forest are caught, marked and put back. Later, a second sample of 50 deer is caught. 4 of these are marked. (a) Work out an estimate for the number of deer in a forest. (b) State one assumption you have made.	
2 The number of members of a club is increased by 10% in one year. The next year the number of members is decreased by 25%. The next year the number of members is increased by 5%. There are now 693 members. How many members were there to begin with?	
3 Solve $5 \tan x - 7 = 0$ for $0° \leq x \leq 360°$. (Calculator) Give your answers correct to 1 decimal place.	
4 The brightness of a lamp is inversely proportional to the square of the distance from the lamp. The distance from the lamp is increased by 100%. Work out the percentage change in the brightness of a lamp.	
5 The diagram shows the straight line L, which passes through the points A and B. The line M is perpendicular to L and passes through B. Find the equation of M in the form $y = mx + c$.  	

Day 57	S Tier 10-a-day

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



7 Beth and Callum play a match. The first to win 2 table tennis games wins the match.
The probability that Beth wins any one of the table tennis games is $\frac{1}{3}$.
Work out the probability that Beth wins the match.

8 Solve the simultaneous equations
$x^2 + y^2 = 10$
$x + y = 4$

9 OA = **a** and OB = **b**.
OP = $-3\mathbf{a} - \mathbf{b}$, OQ = $-2\mathbf{a} + 4\mathbf{b}$ and OR = $2\mathbf{a} + 24\mathbf{b}$.
(a) Show that P, Q and R lie on a straight line.
(b) Work out the ratio PQ : QR in its simplest form.

10 Show that $5^{n+2} - 5^n$ is a multiple of 24 for all integer values of n.