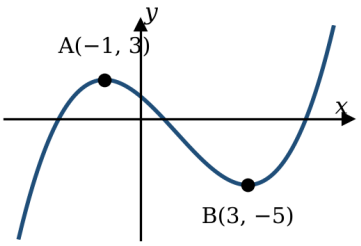
Day 305	A Level Maths: B Tier 10-a-day
1 A ball is thrown vertically upwards at 14.7 m s^{-1} from a point 49 m above horizontal ground. Take g = 9.8 m s^{-2}. Find the time before it hits the ground.	
2 Points A, B and C have position vectors $\begin{pmatrix} 3 \\ -3 \\ -1 \end{pmatrix}$, $\begin{pmatrix} 4 \\ -5 \\ -2 \end{pmatrix}$ and $\begin{pmatrix} 5 \\ q \\ -3 \end{pmatrix}$ respectively. Given that A, B, C are collinear, find q.	
3 A block of mass 4 kg is projected along a rough horizontal surface with speed 14 m s^{-1} and comes to rest after sliding 25 m. Take g = 9.8 m s^{-2}. Use work and energy to find the coefficient of friction.	
4 A curve has parametric equations $x = 4t$, $y = \frac{7}{t}$, $t \neq 0$. Find a Cartesian equation of the curve.	
5 X ~ B(12, 0.5) and Y ~ B(7, 0.3) are independent. Find P(X = 5 and Y ≤ 1), to 3 significant figures.	

Day 305 **A Level Maths: B Tier 10-a-day**

6 The diagram shows the curve y = f(x). A and B are the turning points. Find the turning points of:
(a) y = 2f(x) (b) y = f(x) + 5



7 A bag has 8 red and 5 blue counters; two are taken without replacement.
(a) Find P(exactly one red).
(b) Find P(at least one red).

8 Solve $3\sin^2 x + 8\cos x - 7 = 0$ for $0 \leq x \leq 360°$,
giving answers to 1 d.p. where necessary.

9 The line $4x + 3y = k$ is a tangent to the circle $(x + 4)^2 + y^2 = 25$.
Find the two possible values of k.

10 Line l_1: $\mathbf{r} = \begin{pmatrix} 0 \\ 3 \\ -1 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ -1 \\ 1 \end{pmatrix}$.

Line l_2: $\mathbf{r} = \begin{pmatrix} 0 \\ 0 \\ -2 \end{pmatrix} + \mu \begin{pmatrix} 1 \\ 2 \\ 2 \end{pmatrix}$.

Show that l_1 and l_2 intersect and find the point.