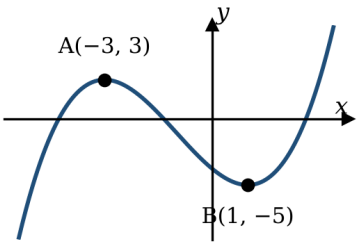
Day 218	A Level Maths: B Tier 10-a-day
1 Simplify $\frac{(2x^3)^2 \times 3x^3}{x^8}$.	
2 A box of mass 15 kg rests on a rough horizontal floor, with coefficient of friction 0.2. A horizontal force of 35 N is applied to the box. Take $g = 9.8$ m s^{-2}. Determine whether the box moves. Find the friction force, or the acceleration if it moves.	
3 Solve $-4x^2 - 10x + 6 > 0$.	
4 A bag has 4 red and 8 blue counters; two are taken without replacement. (a) Find P(exactly one red). (b) Find P(at least one red).	
5 Given that $y = (x + 3)e^{-3x}$, find $\frac{dy}{dx}$, and its value when $x = 0$.	

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6 The diagram shows the curve y = f(x). A and B are the turning points. Find the turning points of:
(a) y = f(−x) (b) y = f(x) − 3



7 A suitcase of mass 12 kg is dragged at constant speed along rough horizontal ground by a rope inclined at angle α above the horizontal, where $\cos \alpha = \frac{3}{5}$.
The coefficient of friction is 0.5. Take g = 9.8 m s^{-2}. Find the tension in the rope.

8 Given that each component fails independently with probability 0.4, find the least number of components needed for the probability of at least one success to exceed 0.9.

9 The vector $\mathbf{a} = \begin{pmatrix} -4 \\ 7 \\ -4 \end{pmatrix}$.
Find |a| and a unit vector in the direction of a.

10 The variables x and y satisfy $y = ax^n$. A graph of ln y against ln x is a straight line with gradient 1.5 that passes through (0, ln 4). Find the values of a and n.