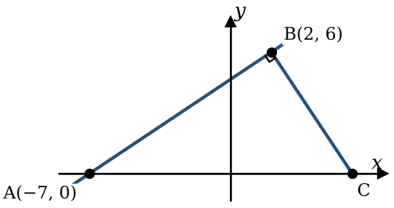
Day 199	A Level Maths: S Tier 10-a-day
1 Find the sum of all the integers from 1 to 637 inclusive that are divisible by 6 or by 10, but not by both.	
2 A radioactive sample has mass $m = m_0e^{-kt}$ grams, t in days. Initially m = 160 and after 3 days m = 128. Find k, and the time for the mass to fall to 16 grams, to 3 s.f.	
3 Three forces $(-4\mathbf{i} + 4\mathbf{j})$ N, $(-2\mathbf{i} + k\mathbf{j})$ N and $(-\mathbf{i} + 6\mathbf{j})$ N act on a particle of mass 4 kg. The resultant is parallel to $(-7\mathbf{i} + 13\mathbf{j})$. Find (a) the value of k, (b) the magnitude of the acceleration of the particle, to 3 s.f.	
4 Solve $\log_3(x + 57) + \log_3(x - 23) = 4$, justifying clearly any root that you reject.	
5 Solve $x^3 + 3x^2 - 6x - 8 \leq 0$.	

Day 199	A Level Maths: S Tier 10-a-day
6 The curve $y = x^2\sqrt{5 - x}$, for $0 < x < 5$, has one stationary point. Find its exact coordinates and determine its nature.	
7 X ~ B(80, 0.4). (a) State why a normal approximation is suitable for X. (b) Use a normal approximation to estimate $P(28 \leq X \leq 36)$, to 3 significant figures.	
8 Faults in a cable occur at random at a mean rate of 4 per hour. After a modification, 10 faults are found in 1 hour. Test at the 5% level whether the rate of faults has increased.	
9 In the diagram, line l_1 passes through A and B. Line l_2 is perpendicular to l_1 at B and meets the x-axis at C. Find the coordinates of C and the area of triangle ABC. 	
10 A car of mass 800 kg, with engine power 10.704 kW, climbs a straight road with $\sin\alpha = \frac{1}{25}$ against a constant resistance of 400 N. Find (a) the greatest steady speed up the hill, (b) the acceleration at 5 m s^{-1}. Take g = 9.8 m s^{-2}.	