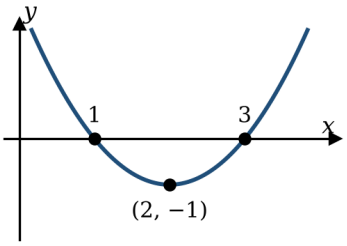
Day 321	A Level Maths: B Tier 10-a-day
1 The points A and B have coordinates $(-2, 8)$ and $(8, -2)$. (a) Find the midpoint of AB. (b) Find the line AB as $ax + by + c = 0$, with integer a, b, c.	
2 A sector of a circle has radius 10 cm and arc length 18 cm. Find (a) the angle of the sector in radians, (b) the area of the sector.	
3 Two forces $(2\mathbf{i} - 5\mathbf{j})$ N and $(6\mathbf{i} - \mathbf{j})$ N act on a particle of mass 5 kg. Find the magnitude of the acceleration of the particle.	
4 Prove that $n^3 + 5n + 7$ is odd for all integers n.	
5 A trolley of mass 5 kg is moving on a smooth horizontal surface at 4 m s^{-1} when a constant horizontal force of 6 N, in the direction of motion, acts for 2 s. Find the speed of the trolley at the end of this time and the distance it moves.	

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6 The diagram shows the curve y = f(x), a quadratic. (a) Find the coordinates of the local maximum point of y = |f(x)|. (b) How many solutions has |f(x)| = 2?  	
7 Solve $2\cot^2 x - \operatorname{cosec} x - 8 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p.	
8 Given that each lottery ticket wins a prize independently with probability 0.1, find the least number of tickets needed for the probability of at least one success to exceed 0.9.	
9 The height of the tide in a harbour is modelled by $H = 12 + 6\sin(\frac{\pi t}{12})$, where t is in hours after midnight. Find (a) the greatest and least values, (b) the values of t with $0 \leq t \leq 24$ when it equals 9 m.	
10 The mass, X g, of a loaf is normally distributed with mean 20 and s.d. 6. A random sample of 4 is taken. Find the probability that the mean mass is less than 17 (3 s.f.).	