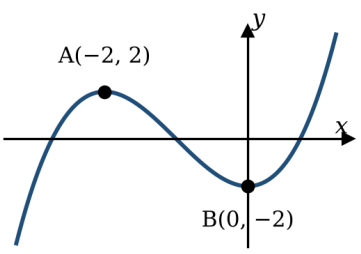
Day 139	A Level Maths: B Tier 10-a-day
1 Solve $2^x = 3^{x+2}$, giving your answer to 3 s.f.	
2 X ~ Po(5), modelling the number of emails received per hour. Find, to 3 significant figures, (a) P(X ≥ 4) (b) P(X ≤ 4)	
3 The points A and B have coordinates (0, −4) and (2, −1). (a) Find the midpoint of AB. (b) Find the line AB as ax + by + c = 0, with integer a, b, c.	
4 7 values of x are coded using $y = \frac{(x - 100)}{2}$. $\Sigma y = 7$ and $\Sigma y^2 = 177$. Find the mean and standard deviation of x (3 s.f.).	
5 The diagram shows the curve y = f(x). A and B are the turning points. Find the turning points of: (a) y = f(x + 1) (b) y = f(x) + 5  	

Day 139	A Level Maths: B Tier 10-a-day
6 A particle P moves on a straight line from O. At time t s its velocity is $6t^2 - 24t + 18$ m s^{-1}. Find the first time P is at instantaneous rest, and its distance from O then.	
7 Solve $12\sin^2 x + 3 - 13\sin x = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.	
8 A geometric series has first term 7 and common ratio 3. Find the smallest value of n for which the sum of the first n terms exceeds 20000.	
9 Line l_1: $\mathbf{r} = \begin{pmatrix} -1 \\ 3 \\ 4 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ -2 \\ -1 \end{pmatrix}$. Line l_2: $\mathbf{r} = \begin{pmatrix} 0 \\ -1 \\ 0 \end{pmatrix} + \mu \begin{pmatrix} 2 \\ -2 \\ 1 \end{pmatrix}$. Show that l_1 and l_2 intersect and find the point.	
10 A particle has velocity $(\mathbf{i})$ m s^{-1} at time t = 0 and moves with constant acceleration $(4\mathbf{i} + 4\mathbf{j})$ m s^{-2}. Find its velocity and speed when t = 5.	