Day 167	IGCSE 10-a-day
1 Here are the first five terms of a quadratic sequence. 7, 11, 19, 31, 47 Find an expression for the nth term.	
2 The point A lies on the curve $y = -2x^2 - 5x - 1$ where $x = 0$. Find the equation of the normal at A. Give your answer in the form $ax + by + c = 0$ where a, b and c are integers.	
3 A is the point $(-5, 2)$ and B is the point $(8, -1)$. (a) Write down the vector $\mathbf{AB}$. (b) Find $\lvert\mathbf{AB}\rvert$, giving the answer as a surd in simplest form if it is not exact.	
4 The point P(6, 2) lies on the graph of $y = f(x)$. Write down the coordinates of the image of P on the graph of (a) $y = f(x + 2)$ (b) $y = f(x) + 2$	
5 The curve $y = x^3 + 3x^2 - 18x + 5$ has gradient -9 at two points. Find the x coordinates of these points.	

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6 $M = \begin{pmatrix} -2 & -3 \\ -1 & -2 \end{pmatrix}$. (a) Find M^{-1}. (b) Use your answer to (a) to solve $-2x - 3y = -18$ $-x - 2y = -12$	
7 The volume, V cm^3, of a sphere of radius r cm is $V = \frac{4}{3}\pi r^3$. (a) Find $\frac{dV}{dr}$ when r = 6. (b) Find the value of r when $\frac{dV}{dr} = 324\pi$.	
8 The price of a laptop is decreased by 50%. The new amount is then decreased by 20%. Work out the overall percentage change.	
9 A population is decreased by x% in one year and then decreased by a further x% the next year. Over the two years the population decreases by 9.75%. Work out the value of x.	
10 A sector of a circle has radius 20 cm and angle 144°. The sector is made into a cone by joining the two straight edges together. (a) Work out the radius of the base of the cone. (b) Work out the exact volume of the cone. Give your answer in terms of π, as a surd if necessary.	