Day 321	IGCSE 10-a-day
1 The 3rd term of an arithmetic sequence is 23. The 6th term of the sequence is 50. (a) Find an expression for the nth term of the sequence. (b) Is 301 a term of the sequence? You must show your working.	
2 A ball is thrown upwards. Its height above the ground, h metres, after t seconds is given by $h = -4t^2 + 40t + 15$ (a) Work out the greatest height reached by the ball. (b) Work out the velocity of the ball when t = 12. State whether it is moving up or down.	
3 A transformation T maps (1, 0) to (4, 2) and (0, 1) to (−1, 0). (a) Write down the matrix that represents T. (b) Find the image of the point (−3, 3) under T.	
4 The probability that a light bulb in a hallway fails in any month is $\frac{1}{4}$. Events on different occasions are independent. Work out the probability that this happens at least once in 5 months. Give your answer correct to 3 significant figures. (Calculator)	
5 $y = (\sqrt{x} + 5)(\sqrt{x} + 4)$ Find $\frac{dy}{dx}$. Give each term of your answer in the form ax^n.	

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6 A solid cylinder of radius 4 cm and height 12 cm is melted down. The metal is used to make identical solid spheres of radius 2 cm. Work out the number of spheres that can be made. The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$.	
7 The line $y = -6x + k$ is a tangent to the curve $y = 3x^2 - 6x + 3$. Find the value of the constant k.	
8 A circular arc has a chord AB of length 20 cm. The greatest distance between the chord and the arc is 2 cm. Work out the radius of the circle.	
9 $M = \begin{pmatrix} -1 & 5 \\ 2 & -1 \end{pmatrix}$. (a) Find M^{-1}. (b) Use your answer to (a) to solve $-x + 5y = 11$ $2x - y = 5$	
10 Show that $(5 - 2\sqrt{7})(5 + 2\sqrt{7})$ is an integer.	