Day 151	IGCSE 10-a-day
1 The position vectors of A and B are $\begin{pmatrix} 5 \\ -3 \end{pmatrix}$ and $\begin{pmatrix} 6 \\ 7 \end{pmatrix}$. (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.	
2 Write these numbers in order of size, starting with the smallest. 0.67, 84%, $\frac{10}{17}$, $\frac{3}{4}$	
3 A particle P moves in a straight line. After t seconds, its displacement from a fixed point O is s metres, where $s = -t^3 + 12t^2 - 36t + 4$ $(t \geq 0)$ Find the distance between the two positions where P is at rest.	
4 The mean of 6 numbers is 152. One number is removed and the mean of the remaining 5 numbers is 176.8. Work out the number that was removed.	
5 Solve $2 \sin x° - 2 = -2$ for $0 \leq x \leq 360$	

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6 A solid cylinder of radius 6 cm and height 8 cm is melted down. The metal is used to make identical solid spheres of radius 3 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 curve $y = x^3 + ax^2 + bx + 4$ has stationary points at $x = -3$ and $x = 3$. Find the values of a and b.	
8 Points A and B are on level ground, 100 m apart, with B between A and the foot of a lighthouse. The angle of elevation of the top of the lighthouse is 43° from A and 63° from B. Work out the height of the lighthouse. Give your answer to 3 significant figures. (Calculator)	
9 The curves $y = 2x^2 - 4x - 2$ and $y = -x^2 - 10x - 5$ touch at one point. Find the coordinates of this point and the equation of the common tangent.	
10 Machine A makes 40% of the bolts in a factory. Machine B makes the rest. 50% of the bolts from machine A are faulty. 10% of the bolts from machine B are faulty. (a) Work out the probability that a bolt chosen at random is faulty. (b) A faulty bolt is found. Work out the probability that it was made by machine A.	