Day 93	IGCSE 10-a-day
1 $y = -4x^{3/2} - 8\sqrt{x}$ Find $\frac{dy}{dx}$. Give each term of your answer in the form ax^n.	
2 Factorise fully $x^4 - 256$	
3 A bag contains counters. $\frac{2}{3}$ of the counters are red and $\frac{1}{5}$ of the counters are blue. The rest of the counters, 6 of them, are green. How many counters are in the bag?	
4 A curve has equation $y = x^4 - 2x^2 + 3$. Find the coordinates of the stationary points of the curve and determine the nature of each.	
5 The set A has 6 elements. (a) Write down the number of subsets of A. (b) Write down the number of proper subsets of A.	

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6 The ratio of men to women people at a meeting is 5 : 3. Then $\frac{1}{4}$ of the men and $\frac{1}{2}$ of the women are taken out. Work out the ratio of men to women now.	
7 A rectangular enclosure is x metres wide and y metres long. It is fenced all round and divided into three equal parts by two fences each of length x metres, parallel to the width. The total length of fencing used is 96 m. (a) Show that the area of the enclosure is A = $-2x^2 + 48x$. (b) Find the maximum possible area, justifying that it is a maximum.	
8 $A = \begin{pmatrix} 6 & -4 \\ 6 & 3 \end{pmatrix}$. $A^2 = pA + qI$, where I is the 2 × 2 identity matrix. Find the value of p and the value of q.	
9 A sector of a circle has radius 24 cm and angle 120°. 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.	
10 Prove algebraically that $m^3 + 29m$ is a multiple of 6 for all integer values of m.	