Day 278	IGCSE 10-a-day
1 $y = -2x^3 - \frac{5}{x^3}$ Find $\frac{dy}{dx}$.	
2 The 4-digit number 397k is a multiple of 9. k is a single digit. Find all the possible values of k.	
3 $\mathbf{a} = \begin{pmatrix} 2 \\ 7 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$. (a) Work out $\mathbf{a} + \mathbf{b}$. (b) Work out $4\mathbf{a} - 2\mathbf{b}$.	
4 A wooden block in the shape of a cuboid weighs 90 N. Its smallest face has area 150 cm^2. Its largest face has area 250 cm^2. Pressure = force ÷ area Work out (a) the greatest pressure and (b) the least pressure the wooden block can exert on the ground, in N/m^2.	
5 Two shapes are mathematically similar. The smaller has height 2 cm and area 28 cm^2. The larger has area 112 cm^2. Work out the height of the larger shape.	

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6 Given that $x > 0$, solve $x^{\frac{1}{3}} = 5$	
7 Solve $2 \tan x + 2 = 0$ for $0 \leq x \leq 360$.	
8 A curve has equation $y = 3x + \frac{48}{\sqrt{x}}$ for $x > 0$. Find the coordinates of the stationary point and determine its nature.	
9 Show that the line $y = -2x + 20$ is a tangent to the circle $x^2 + y^2 = 80$. Find the coordinates of the point where the line touches the circle.	
10 The diagram shows the graph of $s = -t^3 + 6t^2 - 9t$, the displacement in metres of a particle P from O after t seconds. P changes direction at A and B. Work out the total distance travelled in the first 5 seconds. 	