Day 275	IGCSE 10-a-day
1 A curve has equation $y = 4x^{3/2} - 2\sqrt{x}$. Find the equation of the tangent to the curve at the point where $x = 1$.	
2 $f(x) = -2x - 8$. (a) Find $f^{-1}(x)$. (b) Find $f^{-1}(-1)$.	
3 The volume of juice is 820 litres, correct to 2 significant figures. Write down the error interval for the volume of juice, using v.	
4 $n(\xi) = 100$, $n(A) = 43$, $n(B) = 43$ and $n(A \cap B) = 40$. Find $P(A \mid B)$ and $P(B \mid A')$.	
5 The ratio of red to blue marbles in a jar is 9 : 8. Then $\frac{1}{3}$ of the red and $\frac{3}{4}$ of the blue are taken out. Work out the ratio of red to blue now.	

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6 The lengths of the sides of a right-angled triangle are $(x - 6)$ cm, $(x - 4)$ cm and $(x - 2)$ cm. The longest side is $(x - 2)$ cm. (a) Show that $x^2 - 16x + 48 = 0$ (b) Hence work out the area of the triangle.	
7 $y = x^3 + 9x^2 + 5x + 4$ (a) Find $\frac{d^2y}{dx^2}$. (b) Find the value of x for which $\frac{d^2y}{dx^2} = 0$, and work out the gradient of the curve at this value of x.	
8 Make r the subject of $P = \frac{4r - 2}{3r - 1}$	
9 The number of bacteria in a culture, N, after t hours is modelled by $N = -t^3 + 9t^2 + 10t + 100$ for $0 \leq t \leq 12$ Find the time at which N is increasing most rapidly, and the rate of increase at this time.	
10 OA = $\mathbf{a}$ and OB = $\mathbf{b}$. OP = $5\mathbf{a} - 3\mathbf{b}$, OQ = $9\mathbf{a}$ and OR = $17\mathbf{a} + 6\mathbf{b}$. (a) Show that P, Q and R lie on a straight line. (b) Work out the ratio PQ : QR in its simplest form.	