Day 266	IGCSE 10-a-day
1 A flight leaves London at 06:45 (London time). It takes 9 hours 25 minutes. When it is 12:00 in London it is 17:00 in Delhi. At what time, in Delhi time, does the flight land? Say if it is on a different day.	
2 A particle P moves in a straight line. After t seconds its displacement from a fixed point O is s metres, where $s = -t^3 + 2t^2 - 9t \ (t > 0)$ Find (a) the velocity of P, (b) the acceleration of P, when t = 3.	
3 There are 63 employees. 11 of them speak German and 15 of them speak Italian. 44 of them do neither. (a) Work out how many do both. (b) One of the employees is chosen at random. Find the probability that they only speak German.	
4 A concrete slab in the shape of a cuboid weighs 720 N. Its smallest face has area 1000 cm^2. Its largest face has area 3,000 cm^2. Pressure = force ÷ area Work out (a) the greatest pressure and (b) the least pressure the concrete slab can exert on the ground, in N/m^2.	
5 $f(x) = x^{\frac{3}{2}} - 3x$ for $x > 0$ (a) Find the range of values of x for which f is a decreasing function. (b) Find the least value of f(x).	

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6 A machine is worth £1,000 when new. Its value decreases by 8% each year. After how many whole years will it first be worth less than £750? (Calculator)	
7 The nth term of a sequence is $2n^2 + 4n - 4$. (a) Work out the 8th term. (b) Is 239 a term of the sequence? You must show your working.	
8 A curve has equation $y = 2x^3 + 6x^2 + 14x - 4$. (a) Show that the curve has no stationary points. (b) Find the least value of the gradient of the curve.	
9 ABCD is a rectangle with AB = 12 cm and AD = 13 cm. A point P inside the rectangle is such that AP $\leq$ 10 cm and P is nearer to AB than to AD. Work out the area of the region in which P can lie. Give your answer in terms of π.	
10 $g(x) = x^2 - 12x + 34$ for $x \leq 6$. (a) Find the range of g. (b) Find $g^{-1}(x)$.	