Day 173	A Level Maths: B Tier 10-a-day
1 Solve $-10 \leq 5x - 4 < 3$.	
2 Differentiate $y = 2\tan 4x$ with respect to x, and find the exact gradient when $x = \frac{\pi}{12}$.	
3 The points A and B have coordinates (3, 8) and (4, −5). (a) Find the midpoint of AB. (b) Find the line AB as $ax + by + c = 0$, with integer a, b, c.	
4 A uniform rod AB of length 4 m and mass 10 kg hangs horizontally from two vertical strings attached 1 m from A and 1 m from B. A particle of mass 2 kg is attached 1.5 m from A. Take $g = 9.8$ m s^{-2}. Find the tension in each string.	
5 A bag has 7 green and 9 yellow beads; two are taken without replacement. (a) Find P(same colour). (b) Given they are the same colour, find P(both green).	

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6 Solve $\frac{dy}{dx} = (2 + y)e^{-x}$, given that $y = 2$ when $x = 0$.	
7 Solve $(x + 4)(x + 3)(x - 3) \geq 0$.	
8 A stone is projected from level ground with horizontal velocity component 19 m s^{-1} and vertical velocity component 39.2 m s^{-1} upwards. Take $g = 9.8$ m s^{-2}. Find (a) the time of flight, (b) the horizontal range.	
9 Given that each component fails independently with probability 0.15, find the least number of components needed for the probability of at least one success to exceed 0.95.	
10 The area of a square increases at a constant rate of 12 $cm^2 s^{-1}$. Find the rate of increase of the side length when the side is 2 cm.	