Day 286	A Level Maths: A Tier 10-a-day
1 (a) Solve $3x + 8 \leq 3$. (b) Solve $x^2 + 5x > 0$. (c) Hence find the values of x satisfying both inequalities.	
2 Summary statistics for the daily total rainfall (mm) in the same month are: Heathrow: mean 9.5, standard deviation 2.7; Leuchars: mean 11, standard deviation 2.3. Make two comparisons.	
3 A 5 kg box is pulled along rough horizontal ground, $\mu = 0.1$, by a rope at angle θ above the horizontal, where $\tan\theta = \frac{4}{3}$. The tension is 40 N. Find (a) the normal reaction, (b) the acceleration of the box. Take $g = 9.8$.	
4 An arithmetic series has first term 8 and common difference 5. The sum of the first n terms is 426. Find n.	
5 Solve $2\sec^2 x - \tan x - 5 = 0$ for $-180° \leq x \leq 180°$. Give answers to 1 d.p.	

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6 For a sample of 11 pairs of values of daily rainfall and ice cream sales, r = 0.82. The critical value for a one-tailed test at the 1% level is 0.6851. Test, at this level, whether there is positive correlation between the two variables.	
7 The sum of the first n terms of an arithmetic series is $S_n = 4n^2 - n$. (a) Find the first term and the common difference. (b) Find u_{22}.	
8 A curve has equation $2x^2 - 2xy + 2y^2 = 24$. Find the coordinates of the points where the tangent is parallel to the x-axis.	
9 A particle is projected up a line of greatest slope of a smooth plane inclined at α. It passes A, 12.25 m from the start, after 2 s and again after 5 s. Find (a) the speed of projection, (b) α to 1 d.p. Take g = 9.8.	
10 A hemispherical bowl of radius 5 cm is filled at 30 cm^3s^{-1}. When the depth is h, $V = \pi(5h^2 - \frac{1}{3}h^3)$. Find $\frac{dh}{dt}$ when h = 4 cm.	