Day 144	A Level Maths: A Tier 10-a-day
1 A is acute and B is obtuse, with $\sin A = \frac{7}{25}$ and $\cos B = -\frac{3}{5}$. Find the exact values of $\tan(A-B)$ and $\sin(A+B)$.	
2 (a) Solve $4x - 1 < -6$. (b) Solve $x^2 + 2x - 8 \geq 0$. (c) Hence find the values of x satisfying both inequalities.	
3 A data set has mean 50 and standard deviation 2. A value is treated as an outlier if it is more than 3 standard deviations from the mean. Which of 43, 51, 52, 65 are outliers?	
4 Find the sum of all the integers from 1 to 66 inclusive that are not multiples of 13.	
5 A 2 kg particle rests on a rough plane inclined at α, $\tan\alpha = \frac{8}{15}$, $\mu = 0.25$. A force of P N acts up a line of greatest slope and the particle stays at rest. Find the range of values of P. Take g = 9.8. Give answers to 3 s.f. if not exact.	

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6 Find the exact coordinates of the stationary point of $y = \frac{e^x}{x}$ for $x > 0$.	
7 Prove that no cube number can be of the form $7k + 4$, where k is an integer.	
8 Solve the differential equation $\frac{dy}{dx} = 6xy^2$, given that $y = 2$ when $x = 0$. Give y in terms of x.	
9 A 4 kg particle is in equilibrium on a rough plane inclined at α, $\tan\alpha = \frac{24}{7}$, $\mu = 0.25$. A horizontal force of P N, in the vertical plane through a line of greatest slope, pushes it towards the plane. Find the least and greatest values of P. Take $g = 9.8$. Give answers to 3 s.f. if not exact.	
10 How many arrangements of the letters of NUMBERS begin and end with a consonant?	