Day 86	A Level Maths: S Tier 10-a-day
1 The circle $x^2 + y^2 + 2x - 99 = 0$ passes through P(5, 8). The tangent at P meets the axes at A and B. Find the area of triangle OAB.	
2 25 recorded lengths (cm) have mean 50 and standard deviation 8. One value was recorded as 32 but should have been 56. Find the correct mean and the correct standard deviation.	
3 Solve $\text{cosec}(2\theta + 25°) = -\sqrt{2}$ for $-90° \leq \theta \leq 270°$.	
4 An arithmetic sequence has $u_5 = 21$ and $S_{10} = 235$. (a) Find the first term and common difference. (b) Find the least n for which $S_n > 855$.	
5 Car A passes a point O travelling at a constant speed of 8 m s^{-1}. 4 s later, car B leaves O from rest with constant acceleration 1.25 m s^{-2}, travelling in the same direction. B overtakes A at the point X. Find (a) the time B takes to reach X, (b) the distance OX, (c) the speed of B at X.	

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6 A curve has parametric equations $x = \ln t$, $y = 5t^2 + t$, $t > 0$. Find the equation of the tangent where $t = 1$, in the form $y = mx + c$.	
7 A box of weight 40 N is pulled at constant speed along rough horizontal ground ($\mu = 0.75$) by a force P N at angle θ above the horizontal. (a) Find P when $\tan\theta = \frac{24}{7}$. (b) Find the least possible value of P as θ varies, and the corresponding θ to 1 d.p.	
8 A and B are acute angles with $\tan A = \frac{1}{3}$ and $\tan B = \frac{1}{2}$. Find $\tan(A + B)$ and hence show that $A + B = \frac{\pi}{4}$.	
9 The curve C has parametric equations $x = 2t$, $y = 3t^2$. The line $y = 9x - 24$ meets C at A and B. Find the exact length AB.	
10 A rare allele is present in 2% of a population. A test is positive for 98% of those with it and for 1% of those without it. Find P(positive) and P(has it | positive).	