Day 347	A Level Maths: B Tier 10-a-day
1 Solve $\sin x = -\frac{\sqrt{2}}{2}$ for $0 \leq x \leq 360°$.	
2 Describe the single transformation that maps the graph of $y = f(x)$ onto the graph of: (a) $y = f(-x)$ (b) $y = 3f(x)$ (c) $y = f(\frac{x}{4})$	
3 A box of mass 5 kg rests on a rough horizontal floor, with coefficient of friction 0.2. A horizontal force of 12 N is applied to the box. Take $g = 9.8$ m s^{-2}. Determine whether the box moves. Find the friction force, or the acceleration if it moves.	
4 8 values of x are coded using $y = \frac{(x - 20)}{10}$. $\Sigma y = 29$ and $\Sigma y^2 = 285$. Find the mean and standard deviation of x (3 s.f.).	
5 The circle C has equation $(x - 3)^2 + (y + 4)^2 = 100$. The point P$(-5, -10)$ lies on C. Find an equation of the tangent to C at P, in the form $ax + by + c = 0$ with integer a, b, c.	

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6 A uniform rod AB of length 4 m and mass 20 kg hangs horizontally from two vertical strings attached 0.5 m from A and 0.5 m from B. A particle of mass 1 kg is attached 2 m from A. Take g = 9.8 m s^{-2}. Find the tension in each string.	
7 A curve has parametric equations $x = 2t^2$, $y = 4t$. Find $\frac{dy}{dx}$ in terms of t, and the equation of the tangent at $t = -2$.	
8 The scores on a test are normally distributed. $P(X < 74) = 0.0668$ and $P(X > 84) = 0.1587$. Find the mean and standard deviation (3 s.f.).	
9 Express $\sin\theta - \cos\theta$ in the form $R\sin(\theta - \alpha)$, with $R > 0$ and $0 < \alpha < 90°$. Hence state the minimum value of the expression. Give α to 1 d.p.	
10 A geometric series has first term 4 and common ratio 2. Find the smallest value of n for which the sum of the first n terms exceeds 20000.	