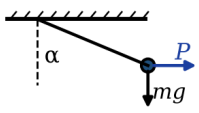
Day 187	A Level Maths: B Tier 10-a-day
1 A coin is dropped from rest from a window, 19.6 m above the ground. Take g = 9.8 m s^{-2}. Find (a) the time taken to reach the ground, (b) its speed on landing.	
2 Expand and simplify $(1 + 2\sqrt{3})(4 - 3\sqrt{3})$, giving your answer in the form $a + b\sqrt{3}$.	
3 A battery lasts X hours, normal with mean 50, s.d. 3. Find k (3 s.f.): (a) P(X < k) = 0.25, (b) P(X > k) = 0.1.	
4 $f(x) = e^x - 4x$. Use the Newton-Raphson method with $x_0 = 0.4$ to find x_1 and x_2, to 4 d.p.	
5 A particle of mass 5 kg hangs in equilibrium on a light string inclined at α to the vertical, held by a horizontal force P N, as shown. $\tan\alpha = \frac{12}{5}$. Take g = 9.8 m s^{-2}. Find the tension in the string and the value of P. 	

Day 187	A Level Maths: B Tier 10-a-day
6 Solve $4\tan^2 x - 4\sec x - 11 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p.	
7 Find the coefficient of x^3 in the expansion of $(1 + 3x)(2 + 2x)^4$.	
8 15 pairs of hours of sleep and reaction time give r = 0.547. Two-tailed critical value (5%): 0.5140. Test for correlation.	
9 Express $5\cos\theta + 12\sin\theta$ in the form $R\cos(\theta - \alpha)$, where $R > 0$ and $0 < \alpha < 90°$. Give α to 1 d.p.	
10 The line $y = -x - 2$ meets the circle $(x - 2)^2 + (y - 1)^2 = 25$ at the points A and B. Find the coordinates of A and B, and the exact length of the chord AB.	