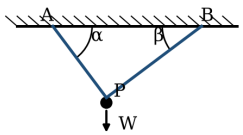
Day 295	A Level Maths: S Tier 10-a-day
1 The curve $y = ab^x$ passes through (1, 18) and (5, 1458). Find the exact values of a and b, and the value of y when x = 7.	
2 A stone is thrown vertically upwards with speed 11 m s^{-1} from the top of a cliff. The top of the cliff is 34.4 m above the sea. Find (a) the time taken for the stone to reach the sea, (b) the total distance travelled by the stone, to 3 s.f. Take g = 9.8 m s^{-2}.	
3 A binomial random variable X has mean 7 and variance 5.6. (a) Find n and p. (b) Find P(X = 6), correct to 3 significant figures.	
4 Solve simultaneously: $x + 2y = -8$ $2x^2 - xy - y^2 = -7$	
5 A particle P of weight 46 N hangs in equilibrium from two light strings AP and BP attached to a horizontal ceiling at A and B (see diagram), where $\tan\alpha = \frac{4}{3}$ and $\tan\beta = \frac{3}{4}$. Find (a) the tension in each string, (b) the greatest weight P could have if neither tension may exceed 48.8 N. 	

Day 295	A Level Maths: S Tier 10-a-day
6 $u_{n+1} = u_n + 3n - 4$, $u_1 = 3$. (a) Show that $u_n = an^2 + bn + c$ and find a, b, c. (b) Find the least n for which $u_n > 730$.	
7 $f(\theta) = \frac{1}{10 + 3\sin\theta + 4\cos\theta}$ (a) Write $3\sin\theta + 4\cos\theta$ as $R\sin(\theta + \alpha)$, $R > 0$, $0 < \alpha < 90°$. (b) Find the greatest and least values of $f(\theta)$, and the smallest positive θ at which the greatest value occurs, to 1 d.p.	
8 A curve is given by $x = y^3 + 3y^2 + 2y$. Find dy/dx and d^2y/dx^2 when $y = -2$.	
9 The circle with equation $(x + 0)^2 + (y + 0)^2 = 25$ passes through $P(-3, 4)$. The tangent at P meets the axes at A and B. Find the area of triangle OAB.	
10 A battery's life, in hours, is $N(57, 12^2)$. Given that it exceeds 69, find the probability that it exceeds 78.	