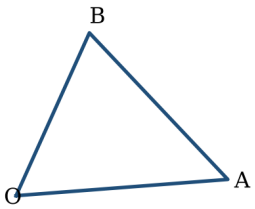
Day 261	A Level Maths: B Tier 10-a-day
1 P(A) = 0.25, P(B) = 0.6, P(A ∩ B) = 0.09. Find (a) P(A ∪ B), (b) P(A | B). (c) Are A and B independent?	
2 Prove that $(n + 2)^2 - (n - 2)^2$ is a multiple of 8 for all integer values of n.	
3 The random variable X has E(X) = 6 and Var(X) = 9. Find (a) E(3X + 3), (b) Var(3X + 3), (c) $E(X^2)$.	
4 In triangle OAB, OA = a and OB = b. M lies on AB with AM : MB = 3 : 1, and N lies on OB with ON : NB = 3 : 1. Find OM and NM in terms of a and b. 	
5 A car of mass 1000 kg moves along a horizontal road. The engine works at a constant rate of 24 kW. The resistance to motion is constant at 600 N. Find the acceleration when the speed is 10 m s^{-1}.	

Day 261	A Level Maths: B Tier 10-a-day
6 $f(x) = \sqrt{x + 4}$ for $x \geq -4$. Find $f^{-1}(x)$ and state its domain.	
7 Given that $y = x^3 \cos 3x$, find $\frac{dy}{dx}$, and its value when $x = \frac{\pi}{3}$.	
8 The line $3x - 4y = k$ is a tangent to the circle $(x - 2)^2 + y^2 = 100$. Find the two possible values of k.	
9 (a) Write $\cos\theta + \sin\theta$ in the form $R\cos(\theta - \alpha)$, with $R > 0$ and $0 < \alpha < 90°$. (b) Hence find its maximum value and the smallest $\theta \geq 0$ at which it occurs. Give α to 1 d.p.	
10 A particle moves so that its position vector relative to O at time t s is $\mathbf{r} = (3t^2 - t)\mathbf{i} + (3t^3 + 3t)\mathbf{j}$ metres. Find the velocity when t = 1, and the speed at that time.	