Day 358	A Level Maths: S Tier 10-a-day
1 For events A and B, P(A) = 0.5, P(B) = 0.65 and P(A | B) = 0.6. (a) Find P(A ∩ B). (b) Find P(A′ | B′).	
2 Three forces $(-6\mathbf{i} - 5\mathbf{j})$ N, $(6\mathbf{i} + k\mathbf{j})$ N and $(-4\mathbf{i} - 5\mathbf{j})$ N act on a particle of mass 5 kg. The resultant is parallel to $(-4\mathbf{i} - 9\mathbf{j})$. Find (a) the value of k, (b) the magnitude of the acceleration of the particle, to 3 s.f.	
3 $X \sim N(\mu, 25)$. H_0: $\mu = 69$ is tested against H_1: $\mu > 69$ using the mean of a sample of size 36 at the 1% level. (a) Find the critical region for the sample mean. (b) Find the probability of a Type II error when $\mu = 70$.	
4 Solve the simultaneous equations $\log_2 x - \log_2 y = 1$ $x + y = 21$	
5 Solve simultaneously: $x + y = -3$ $3x^2 - 2xy - y^2 = 7$	

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6 The curve C has equation $x^2y + xy^2 = -6$. Find the equation of the normal to C at the point $(3, -1)$, in the form $ax + by + c = 0$ with integers a, b, c.	
7 Solve $x^3 + 3x^2 - 4 < 0$.	
8 A particle P moves on a straight line. At time t seconds its velocity is v m s^{-1}, where $v = 3t^2 - 15t + 12$ for $0 \leq t \leq 6$ Find (a) the times at which P is at instantaneous rest, (b) the total distance travelled by P in the first 6 seconds.	
9 The curve C has equation $x^2 + xy + 2y^2 = 63$. Find the coordinates of the points on C where the tangent is parallel to the x-axis.	
10 The curve C has equation $y = \frac{-2x + 10}{x - 1}$. (a) Write down the equations of the asymptotes of C. (b) The line $y = -2x + k$ is a tangent to C. Find the possible values of k.	