Day 325	A Level Maths: B Tier 10-a-day
1 Find the exact value of $\int_0^{\frac{\pi}{2}} \sin^2 x \, dx$.	
2 Solve the equation $5^{2x} - 6\times5^{x} + 5 = 0$.	
3 P(A) = 0.25, P(B) = 0.4, P(A ∩ B) = 0.05. Find (a) P(A ∪ B), (b) P(A | B). (c) Are A and B independent?	
4 A woman of mass 60 kg stands on weighing scales in a lift. The lift decelerates at 1 m s^{-2} while moving upwards. Take g = 9.8 m s^{-2}. Find the force exerted on the woman by the scales.	
5 Find y in terms of x, given that $\frac{dy}{dx} = 3y^2e^x$ and y = 0.25 when x = 0.	

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6 Line l_1 has equation $x + y = -3$ and line l_2 has equation $5x - 2y = 20$. The lines meet at P. Find the area of the triangle formed by l_1, l_2 and the x-axis.	
7 Simplify $\frac{\sin 2x}{1 + \cos 2x}$, giving your answer as a single trigonometric term.	
8 The random variable X is normally distributed. $P(X < 28) = 0.1587$ and $P(X > 64) = 0.0228$. Find the mean and standard deviation (3 s.f.).	
9 A sports car starts from rest and accelerates at $1\ \text{m s}^{-2}$. At that moment it is passed by a coach travelling at constant speed $12\ \text{m s}^{-1}$. Find how long it takes to catch up, and the distance travelled.	
10 Solve $2x^2 + 7x \geq -3$.	