Day 332	A Level Maths: B Tier 10-a-day
1 A survey covers 56 urban, 44 suburban and 24 rural households. A stratified sample of size 31 is taken. Find the number selected from each group.	
2 Simplify $\sqrt{45} + \sqrt{245} + \sqrt{180}$, giving your answer in the form $k\sqrt{5}$.	
3 A and B are mutually exclusive events with P(A) = 0.1 and P(A ∪ B) = 0.7. (a) Find P(B). (b) Find P(A' ∩ B').	
4 Find the quotient and the remainder when $-x^3 - 7x^2 - 13x - 10$ is divided by (x + 3).	
5 A population is modelled by $N = N_0e^{kt}$, where t is in hours. Initially N = 1500 and after 2 hours N = 3750. Find (a) k to 3 s.f., (b) when N reaches 7500, to 3 s.f.	

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6 A particle P moves on a straight line from O. At time t s its velocity is $3t^2 - 21t + 30$ m s^{-1}. Find the first time P is at instantaneous rest, and its distance from O then.	
7 For small θ (in radians), use the small angle approximations to find the value of $\lim_{\theta \to 0} \frac{\tan 2\theta \sin 3\theta}{1 - \cos 2\theta}$.	
8 (a) Expand $(1 + 5x)^{\frac{1}{2}}$ up to the x^2 term. (b) Use x = 0.04 to estimate $\sqrt{1.20}$ to 5 decimal places.	
9 A cup of tea cools in a room at 25°C: $\frac{dT}{dt} = -k(T - 25)$. Initially T = 100 and after 8 minutes T = 45. Find k to 3 s.f. and the time to cool to 35°C, to 3 s.f.	
10 A missile is projected horizontally at 117.6 m s^{-1} from a point high above the ground. Take g = 9.8 m s^{-2}. Find the speed and the direction of motion 16 s later, to 1 d.p. below the horizontal.	