Day 136	A Level Maths: A Tier 10-a-day
1 A company employs 192 people: 48 Sales, 56 Admin and 88 Production. A stratified sample of size 24 is taken. Find the number of people sampled from each group.	
2 A ball is thrown vertically upwards at 34.3 m s^{-1} from a point h m above horizontal ground, and hits the ground 11 s later. Find (a) h, (b) the greatest height above the ground. Take g = 9.8.	
3 Summary statistics for the daily mean windspeed (knots) in the same month are: Camborne: mean 17, standard deviation 2.6; Leeming: mean 7, standard deviation 3.7. Make two comparisons.	
4 $y = (3x + 6)e^{-x}$. Find the exact coordinates of the stationary point and determine its nature.	
5 Expand $(1 - \frac{x}{2})^{-1}$ in ascending powers of x up to and including the term in x^3. State the range of values of x for which the expansion is valid.	

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6 A closed cylinder has radius r cm and volume 2π cm^3. Show that its surface area is $A = 2\pi r^2 + \frac{4\pi}{r}$, and find the minimum value of A in terms of π.	
7 In the expansion of $(1 + kx)^n$, where n is a positive integer, the coefficient of x is -9 and the coefficient of x^2 is 36. Find n and k.	
8 A curve has equation $2x^2 + 2xy + 2y^2 = 54$. Find the coordinates of the points where the tangent is parallel to the x-axis.	
9 A ball is projected from a point O on horizontal ground at angle α above the horizontal, $\tan\alpha = \frac{3}{4}$, and passes through A, 16 m horizontally from O and 7.1 m above the ground. Find the speed of projection. Take g = 9.8.	
10 Solve $x(\sqrt{5} - 2) = -2 - 4\sqrt{5}$, writing x in the form $p + q\sqrt{5}$.	