Day 30	A Level Maths: B Tier 10-a-day
1 A company employs 160 managers, 40 technicians and 60 operators. A stratified sample of size 26 is taken. Find the number selected from each group.	
2 Find (a) $\int 6\sec^2 4x\,dx$, (b) the exact value of $\int_0^{\frac{\pi}{16}} 6\sec^2 4x\,dx$.	
3 A lift of mass 300 kg is raised and lowered by a vertical cable. The lift accelerates downwards at 0.5 m s^{-2}. Take g = 9.8 m s^{-2}. Find the tension in the cable.	
4 Express $\frac{6}{3+\sqrt{7}}$ in the form $p + q\sqrt{7}$, where p and q are integers.	
5 A particle moves so that its position vector relative to O at time t s is $\mathbf{r} = (2t^2 - 2t)\mathbf{i} + (t^3)\mathbf{j}$ metres. Find the velocity when t = 4, and the speed at that time.	

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6 X ~ B(11, 0.2) and Y ~ B(9, 0.1) are independent. Find P(X = 1 and Y ≤ 2), to 3 significant figures.	
7 (a) Write $\frac{x + 10}{(x + 1)(x + 4)}$ in partial fractions. (b) Hence evaluate $\int_0^4 \frac{x + 10}{(x + 1)(x + 4)}\,dx$, giving the answer as a single logarithm.	
8 A circle passes through A(−5, −3) and B(1, −5), and its centre lies on the y-axis. Find the centre and the equation of the circle.	
9 Find the x-coordinate(s) of the stationary point(s) of the curve $y = \frac{x^2}{x - 4}$.	
10 Solve $(x + 4)(x + 2)(x - 2) \leq 0$.	