Day 51	A Level Maths: A Tier 10-a-day
1 How many arrangements of the letters of PAINTER have A and R not next to each other?	
2 Find the coefficient of x^4 in the expansion of $(-3 + 2x)^7$.	
3 £20000 is invested at 4% compound interest per year. Find the smallest whole number of years for the value to exceed £60000.	
4 A 4 kg box is pulled from rest along rough horizontal ground by a horizontal force of 20.8 N and moves 9.6 m in 8 s. Find (a) the coefficient of friction. The force is then removed; (b) find the further distance moved. Take g = 9.8. Give answers to 3 s.f. if not exact.	
5 X is normally distributed with mean μ and standard deviation 12. Given that $P(X > 75) = 0.0668$, find μ to 3 significant figures.	

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6 Express $\frac{-2x^2 - 10x - 13}{(x + 3)(x + 2)^2}$ in the form $\frac{A}{(x + 3)} + \frac{B}{(x + 2)} + \frac{C}{(x + 2)^2}$, and find A, B and C.	
7 Particle A (1 kg) rests on a smooth table, joined by a light string over a smooth pulley at the edge to particle B (3 kg), hanging 1.5 m above the floor. Released from rest. Find (a) the tension, (b) the speed of B as it hits the floor. Take g = 9.8. Give answers to 3 s.f. if not exact.	
8 Solve the differential equation $y\frac{dy}{dx} = 3x$, given that y = 3 when x = 0 (y > 0). Give y in terms of x.	
9 The line $4x - 3y = -2$ meets the circle $(x - 2)^2 + (y + 2)^2 = 36$ at the points A and B. Find the exact length of AB.	
10 A curve has equation $2x^2 + 2xy + y^2 = 18$. Find the coordinates of the points where the tangent is parallel to the x-axis.	