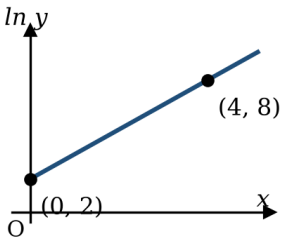
Day 204	A Level Maths: A Tier 10-a-day
1 Summary statistics for the daily mean windspeed (knots) in the same month are: Hurn: mean 11.5, standard deviation 1.2; Beijing: mean 16.5, standard deviation 2.8. Make two comparisons.	
2 Express $\frac{-7x + 11}{(2x - 5)(x + 4)}$ in partial fractions.	
3 A curve has parametric equations $x = 3t - 1$, $y = t^3$. Find $\frac{dy}{dx}$ in terms of t, and the equation of the normal at the point where $t = 2$, in the form $ax + by + c = 0$ (integers).	
4 Express $\frac{2x^2 + x + 6}{(x + 2)(x - 1)}$ in the form $2 + \frac{A}{(x + 2)} + \frac{B}{(x - 1)}$, where A and B are constants to be found.	
5 Particles A (5 kg) and B (2 kg) hang on a light string over a smooth pulley, A being 2.5 m above the ground. Released from rest; A lands without rebounding. Find (a) the tension while both move, (b) the greatest height of B above its start. Take $g = 9.8$. Give answers to 3 s.f. if not exact.	

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6 Express $\frac{5}{(x+2)} - \frac{1}{(x+4)}$ as a single fraction in its simplest form.	
7 X has pdf $f(x) = \frac{6}{216}x(6-x)$ for $0 \leq x \leq 6$, and 0 otherwise. Find E(X), Var(X) and the standard deviation of X (3 s.f.).	
8 (a) Express $6\cos x + 8\sin x$ in the form $R\cos(x-\alpha)$, where $R > 0$ and $0° < \alpha < 90°$. Give α to 1 d.p. (b) Solve $6\cos x + 8\sin x = 5$ for $0° \leq x < 360°$, giving answers to 1 d.p.	
9 The diagram shows the graph of ln y against x for $y = A e^{kx}$. Find the exact values of A and k. 	
10 At t = 0, P and Q have position vectors $(8\mathbf{i} - 8\mathbf{j})$ m and $(5\mathbf{i} + \mathbf{j})$ m and velocities $(-5\mathbf{i} + 4\mathbf{j})$ m s^{-1} and $(-3\mathbf{i} + 3\mathbf{j})$ m s^{-1}. Find (a) the time when they are closest, (b) the least distance between them. Give answers to 3 s.f. if not exact.	