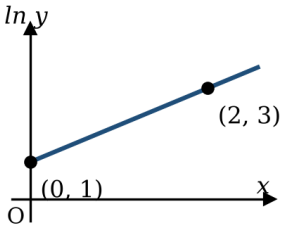
Day 333	A Level Maths: A Tier 10-a-day
1 X, the height (cm), is normally distributed with mean 177 and standard deviation 7. Find (a) P(X > 179.8) (b) P(179.8 < X < 185.4), each to 3 s.f.	
2 θ is small and measured in radians. Use small angle approximations to show that $5\sin 3\theta + \cos\theta = 9$ can be written as $a\theta^2 + b\theta + c = 0$ with integers a, b, c. Hence find the approximate solution with $0 < \theta < 0.8$, to 3 s.f.	
3 Particles A (12 kg) and B (2 kg) hang on a light string over a smooth pulley, A being 1.5 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.	
4 The curve y = f(x) has a maximum point at (5, 1). Find the coordinates of the corresponding point on: (a) y = f(x + 1) (b) y = f(−x) (c) y = −f(x)	
5 n = 10 pairs of (x, y): $\Sigma x = 135$, $\Sigma y = 358$, $\Sigma x^2 = 2525$, $\Sigma xy = 6230$. (a) Find the equation of the regression line of y on x (3 s.f.). (b) Estimate y when x = 18.	

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6 The curve y = f(x), where $f(x) = \frac{3}{x+1} + 2$, is translated by $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$.
Write down the equations of the asymptotes of the new curve, and find where it crosses the x-axis.

7 The diagram shows the graph of ln y against x for $y = A e^{kx}$.
Find the exact values of A and k.



8 Ball A is dropped from rest 196 m above the ground. At the same instant ball B is projected upwards at 39.2 m s^{-1} from the ground directly below A. Find (a) the time when they collide, (b) the height of the collision. Take g = 9.8.

9 A curve has equation $4x^2 - 2xy + 3y^2 = 44$.
Find the coordinates of the points where the tangent is parallel to the x-axis.

10 Find the sum of all the multiples of 8 that lie strictly between 113 and 358.