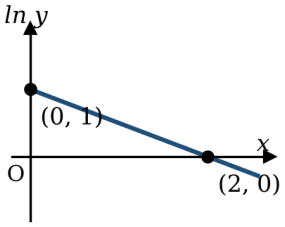
Day 193 **A Level Maths: A Tier 10-a-day**

1 Express $\frac{-4-\sqrt{6}}{1+\sqrt{6}}$ in the form $p + q\sqrt{6}$, where p and q are rational numbers.

2 The diagram shows the graph of ln y against x for $y = A\,b^x$.
Find the exact values of A and b.



3 The line $y = 2x - 2$ meets the curve $y = x^2 - 4x + 6$ at A and B.
(a) Find the coordinates of A and B.
(b) Find the exact length AB.

4 A data set has mean 53 and standard deviation 5.
A value is treated as an outlier if it is more than 2 standard deviations from the mean.
Which of 42, 47, 61, 65 are outliers?

5 Solve $\cos 2\theta + \sin \theta = 1$
for $0 \leq \theta \leq 2\pi$.

Day 193	A Level Maths: A Tier 10-a-day
6 A particle P has position vector $\mathbf{r} = (2t^3 - 5t)\mathbf{i} + (t^2 - 4t)\mathbf{j}$ metres at time t s. Find (a) the speed of P when t = 3, (b) the value of t when P is moving parallel to $\mathbf{i}$. Give answers to 3 s.f. if not exact.	
7 A curve has equation $2x^2 - 4xy + 2y^2 - 3x + 4y = 30$. Show that P(0, 3) lies on the curve and find the equation of the tangent at P in the form ax + by + c = 0 with integer a, b, c.	
8 A uniform ladder AB (13 m, 20 kg) rests with A on rough ground, $\mu = \frac{1}{3}$, and B against a smooth wall, B being 12 m above the ground. A man of mass 75 kg climbs the ladder. How far along the ladder from A can he climb before it slips?	
9 The second term of a geometric series is 12 and its sum to infinity is 50. Find the two possible values of the first term.	
10 $X \sim Po(45)$. Use a suitable approximation to find $P(X \leq 50)$, to 3 significant figures.	