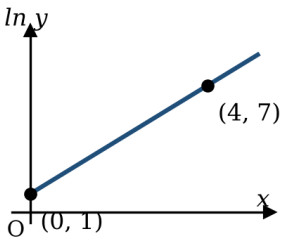
Day 113	A Level Maths: A Tier 10-a-day
1 The points A, B and C have coordinates (1, 2, −1), (2, 3, −3) and (2, 5, 5). Find angle ABC, in degrees to 1 d.p.	
2 $f(x) = 3x^2 + 18x + 29$, $x \geq -3$. Find $f^{-1}(x)$ and state its domain.	
3 For a sample of 13 pairs of values of daily rainfall and ice cream sales, r = 0.337. The critical value for a one-tailed test at the 5% level is 0.4762. Test, at this level, whether there is positive correlation between the two variables.	
4 A, B and C have position vectors $\begin{pmatrix} 0 \\ -2 \\ 3 \end{pmatrix}$, $\begin{pmatrix} 3 \\ 0 \\ 0 \end{pmatrix}$ and $\begin{pmatrix} k \\ -4 \\ 6 \end{pmatrix}$ relative to O, where k is a constant. Given that A, B and C are collinear, find k and the ratio AB : BC.	
5 Prove by contradiction that there are no integers m and n such that 10m + 15n = 67.	

Day 113	A Level Maths: A Tier 10-a-day
6 A ball is projected horizontally at 24 m s^{-1} from a point 4.9 m above horizontal ground. Find (a) the horizontal distance to the landing point, (b) the speed and direction (angle below the horizontal, 1 d.p.) on landing. Take g = 9.8. Give answers to 3 s.f. if not exact.	
7 12 values have $\Sigma x = 636$ and $\Sigma x^2 = 34008$. One value was recorded as 39 but should have been 58. Find the correct mean and standard deviation (3 s.f.).	
8 The line $12x + 5y = 128$ meets the circle $(x - 4)^2 + (y - 3)^2 = 36$ at the points A and B. Find the exact length of AB.	
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 A ball is projected from the ground at 33 m s^{-1} at angle α above the horizontal, $\tan\alpha = \frac{24}{7}$. At time T s, while in flight, it is moving perpendicular to its initial direction. Find (a) T, (b) the height of the ball then. Take g = 9.8. Give answers to 3 s.f. if not exact.	