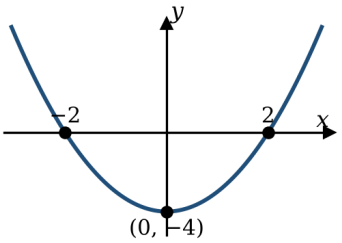
Day 13	A Level Maths: B Tier 10-a-day
1 Given that $y = e^{x^2 - x}$, find $\frac{dy}{dx}$, and the gradient of the curve when $x = 0$.	
2 X ~ B(10, 0.7). Find, to 3 significant figures, (a) $P(4 \leq X \leq 7)$ (b) $P(X > 6)$	
3 Given that $y = e^{-3x} \cos x$, find $\frac{dy}{dx}$, and its value when $x = \frac{\pi}{2}$.	
4 (a) Write $3x^2 + 30x + 66$ in the form $a(x + p)^2 + q$. (b) Write down the coordinates of the minimum point of $y = 3x^2 + 30x + 66$.	
5 A particle moving in a straight line with constant acceleration increases its speed from 2 m s^{-1} to 6.5 m s^{-1} while covering 38.25 m. Find (a) the acceleration, (b) the time taken.	

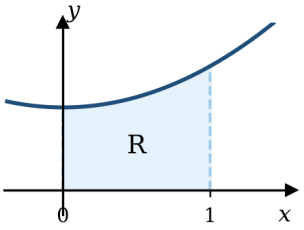
Day 13 **A Level Maths: B Tier 10-a-day**

6 The diagram shows the curve y = f(x), a quadratic.
(a) Find the coordinates of the local maximum point of y = |f(x)|.
(b) How many solutions has |f(x)| = 7?



7 A uniform rod AB of length 6 m and mass 12 kg hangs horizontally from two vertical strings attached 1 m from A and 1 m from B.
A particle of mass 2 kg is attached 1.5 m from A. Take g = 9.8 m s^{-2}. Find the tension in each string.

8 The region R is bounded by the curve $y = x^2 + 2$, the x-axis
and the lines x = 0 and x = 1.
R is rotated through 360° about the x-axis. Find the exact volume generated.



9 Given that each trap catches a rabbit independently with probability 0.15, find the least number of traps needed for the probability of at least one success to exceed 0.999.

10 The line l has equation y = −3x + 10. The point P is (0, 0).
(a) Find the line through P perpendicular to l, as ax + by + c = 0 with integer a, b, c.
(b) Find the foot F and the exact distance PF.