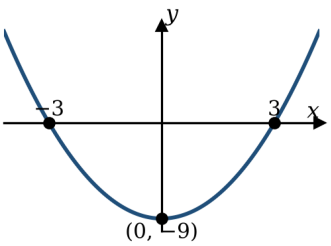
Day 150	A Level Maths: B Tier 10-a-day
1 Solve $x - 5 \geq 4x + 9$.	
2 Given that $y = x^2e^{-2x}$, find $\frac{dy}{dx}$, and its value when $x = 1$.	
3 $X \sim B(10, 0.4)$ and $Y \sim B(9, 0.25)$ are independent. Find $P(X = 3 \text{ and } Y \leq 2)$, to 3 significant figures.	
4 $f(x) = x^2 - 4x + 2$ for $x \leq -1$. Find the range of f.	
5 A box of mass 15 kg rests on a rough horizontal floor, with coefficient of friction 0.5. A horizontal force of 59 N is applied to the box. Take $g = 9.8$ m s^{-2}. Determine whether the box moves. Find the friction force, or the acceleration if it moves.	

Day 150 **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)| = 14?



7 An open tank has a square base of side x m and volume 4 m^3.
Show that its surface area is $S = x^2 + \frac{16}{x}$, and find the minimum value of S.

8 Packet masses are normal, s.d. 5 g. Claimed mean 60 g; 50 packets have mean 61.3 g. Test at the 5% level whether the true mean differs from 60.

9 The function f is defined by f(x) = arctan x. State (a) the domain, (b) the range of f, in radians.

10 A uniform rod AB of length 4 m and mass 24 kg is hinged at A and held horizontal by a light string attached at B.
The string makes an angle θ with the rod, where $\sin\theta = \frac{4}{5}$. Take g = 9.8 m s^{-2}. Find the tension in the string.