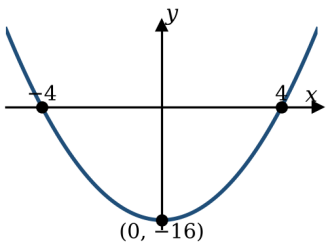
Day 7	A Level Maths: B Tier 10-a-day
1 A and B are mutually exclusive events with P(A) = 0.4 and P(A ∪ B) = 0.65. (a) Find P(B). (b) Find P(A' ∩ B').	
2 The points A and B have coordinates (2, −4) and (6, 8). (a) Find the midpoint of AB. (b) Find the line AB as ax + by + c = 0, with integer a, b, c.	
3 Given that $y = x^3 \ln x$, find $\frac{dy}{dx}$, and its value when x = 1.	
4 For 14 pairs of data, $S_{xx} = 200$, $S_{yy} = 150$ and $S_{xy} = -94$. Find the PMCC (3 s.f.) and describe the correlation.	
5 $f(x) = 2x^3 + px^2 + qx - 6$. When f(x) is divided by (x + 3) the remainder is −12, and when divided by (x + 1) the remainder is 0. Find p and q.	

Day 7	A Level Maths: B Tier 10-a-day

6 A sledge of mass 4 kg is pulled across smooth horizontal ice by a rope with tension 39 N, inclined at α above the horizontal, where $\tan\alpha = \frac{5}{12}$.
Take $g = 9.8$ m s^{-2}.
Find (a) the acceleration of the sledge, (b) the normal reaction of the ice.

7 Find the exact value of
$$\int_0^{\ln 2} \frac{e^x}{e^x + 4}\,dx,$$
giving your answer in the form a ln b.

8 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)| = 16?



9 A box of mass 20 kg rests on a rough horizontal floor, with coefficient of friction 0.6. A horizontal force of 141 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.

10 The curve C has equation $y = x^2e^{1-x} + 3$.
Find the equation of the normal to C at the point where x = 1, in the form y = mx + c.