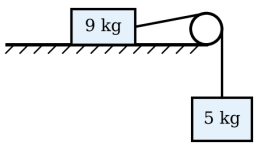
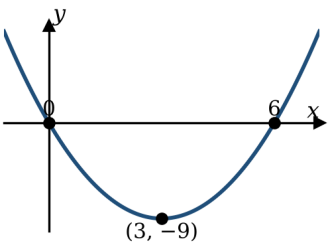
Day 111	A Level Maths: B Tier 10-a-day
1 The mass, X g, of a loaf is normally distributed with mean 60 and s.d. 12. A random sample of 36 is taken. Find the probability that the mean mass is less than 57 (3 s.f.).	
2 Given that $y = x^2e^{2x}$, find $\frac{dy}{dx}$, and its value when $x = 0$.	
3 A is the point $(-6, -2)$ and B is the point $(4, -1)$. Find the perpendicular bisector of AB as $ax + by + c = 0$, with integer a, b, c.	
4 For 11 pairs of values, $\bar{x} = 5$, $\bar{y} = 18$, $S_{xx} = 20$ and $S_{xy} = 10$. (a) Find the regression line of y on x in the form $y = a + bx$. (b) Estimate y when $x = 7$.	
5 A block of mass 9 kg lies on a rough horizontal table (coefficient of friction 0.1). It is joined by a light string over a smooth pulley to a particle of mass 5 kg hanging freely. Take $g = 9.8$ m s^{-2}. The system is released. Find the acceleration and the tension in the string. 	

Day 111 **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)| = 9?



7 Given that $15\cos\theta + 8\sin\theta \equiv 17\cos(\theta - 28.1°)$,
solve $15\cos\theta + 8\sin\theta = -5$ for $0 \leq \theta \leq 360°$.
(1 d.p.)

8 In the binomial expansion of $(1 + kx)^n$, where n is a positive integer, the coefficient of x is -6 and the coefficient of x^2 is 15.
Find the values of n and k.

9 Solve $2\cot^2 x - \operatorname{cosec} x - 1 = 0$ for $0 \leq x \leq 360°$,
giving answers to 1 d.p.

10 Particles A (2 kg) and B (12 kg) are joined by a light string over a smooth pulley. Both are held with the string taut, B is 3.5 m above the ground, then released.
Take g = 9.8 m s^{-2}.
Find the speed with which B hits the ground.