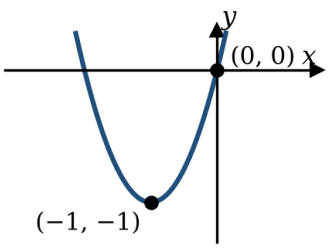
Day 243	A Level Maths: C Tier 10-a-day
1 Sam says that $n^2 + 3n + 27$ is prime for every positive integer n. Show that Sam is wrong.	
2 Differentiate with respect to x: (a) $4e^x + 3 \ln x$ (b) $e^{4x} + \sin 3x$	
3 The diagram shows a sketch of a quadratic curve. Find its equation in the form $y = a(x - p)^2 + q$. 	
4 A train's engine works at a constant rate of 15 kW. Find the driving force when the vehicle is moving at 10 m s^{-1}.	
5 The heights, X cm, of adult men are modelled by $N(60, 8^2)$. Find $P(52 < X < 56)$ to 3 s.f.	

Day 243	A Level Maths: C Tier 10-a-day
6 A lamp of weight 3 N hangs from a light string, pulled aside by a horizontal force P N so that the string makes an angle θ with the vertical, where $\tan\theta = \frac{4}{3}$. Find P and the tension T N.	
7 $f(x) = 24\sin x + 7\cos x + 4$. Write f(x) in the form $R\sin(x + \alpha) + 4$, with α in degrees to 1 d.p., and state the maximum value of f(x).	
8 Solve $\lvert x + 1\rvert = \lvert x - 1\rvert$.	
9 $x = 2\cos t$, $y = 3\sin t$. Find dy/dx in terms of t, and its value when $t = \frac{\pi}{4}$.	
10 A population is $N(\mu, 10^2)$. H_0: $\mu = 90$, H_1: $\mu < 90$. A sample of 36 has mean $\bar{x} = 84.67$. Test at the 5% level. Critical value: $z = -1.645$.	