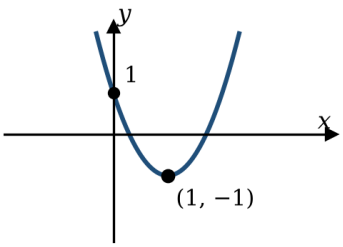
Day 79	A Level Maths: A Tier 10-a-day
1 The 4th term of an arithmetic sequence is 5 and the 11th term is 12. Find the first term and common difference, and the sum of the first 15 terms.	
2 $y = 3^x$. Find the exact gradient of the curve at $x = 2$ and the equation of the tangent there.	
3 A group of 4 men and 7 women. A team of 3 is chosen at random. Find the probability that the team contains at least one of the women.	
4 The diagram shows the curve with equation $y = f(x)$, where f is a quadratic. The turning point is marked, and the curve crosses the y-axis as shown. Find f(x), giving it in the form $ax^2 + bx + c$. 	
5 A non-uniform rod AB (length 6 m, mass 4 kg) has its centre of mass at G, AG = 0.25 m. It hangs horizontally from vertical strings at A and B. A particle of mass m kg is fixed at P, AP = 4.25 m, making the tensions equal. Find (a) m, (b) the tension. Take g = 9.8.	

Day 79 **A Level Maths: A Tier 10-a-day**

6 (a) Express 6 sin x + 8 cos x in the form R sin(x + α), where R > 0 and 0° < α < 90°. Give α to 1 d.p.
(b) Solve 6 sin x + 8 cos x = 3 for 0° ≤ x < 360°, giving answers to 1 d.p.

7 In the expansion of $(1 + kx)^n$, where n is a positive integer, the coefficient of x is 15 and the coefficient of x^2 is 90.
Find n and k.

8 The table summarises the length, l mm, of leaves of 49 items.
Use linear interpolation to estimate the upper quartile.

Class	Frequency
$0 \le l < 10$	12
$10 \le l < 20$	12
$20 \le l < 30$	16
$30 \le l < 40$	7
$40 \le l < 50$	2

9 Particle A (9 kg) rests on a smooth table, joined by a light string over a smooth pulley at the edge to particle B (1 kg), hanging 0.5 m above the floor. Released from rest. Find (a) the tension, (b) the speed of B as it hits the floor. Take g = 9.8. Give answers to 3 s.f. if not exact.

10 θ is acute and tan θ = 5.
Show that $\cos 2\theta = -\frac{12}{13}$ and find the exact value of sin 2θ.