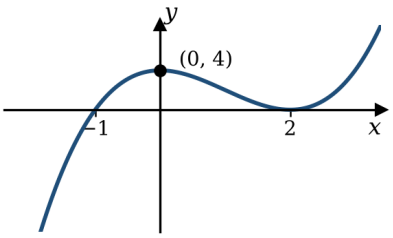
Day 330	A Level Maths: S Tier 10-a-day
1 Solve $\cos 2\theta - 3\sin\theta - 2 = 0$ for $0 \leq \theta < 360°$.	
2 The scores in an aptitude test are modelled by $N(48, \sigma^2)$. The probability of a value above 66 is 0.05. (a) Find σ. (b) Find the probability of a value above 67.	
3 Express $\sqrt{64 + 24\sqrt{7}}$ in the form $a + b\sqrt{7}$, where a and b are positive integers.	
4 A binomial random variable X has mean 6 and variance 5.4. (a) Find n and p. (b) Find P(X = 4), correct to 3 significant figures.	
5 A golf ball is hit from a point O on horizontal ground. It lands 160 m from O, and reaches a maximum height of 30 m above the ground. Find the angle of projection and the speed of projection, to 3 s.f. Take $g = 9.8$ m s^{-2}.	

Day 330 **A Level Maths: S Tier 10-a-day**

6 The tangent to $y = x\sqrt{4x - 4}$ at the point where $x = 2$
meets the axes at A and B. Find the exact area of triangle OAB,
where O is the origin.

7 $u_{n+1} = u_n + n + 2$, $u_1 = 3$.
(a) Show that $u_n = an^2 + bn + c$ and find a, b, c.
(b) Find the least n for which $u_n > 1346$.

8 The diagram shows the cubic y = f(x), which touches the x-axis once. Find f(x), giving your answer in expanded form.



9 $y = e^{-3x} \sin 2x$. Show that $dy/dx = e^{-3x}(-3 \sin 2x + 2 \cos 2x)$.
Find the x coordinate of the stationary point with the smallest positive x (3 s.f.), and its nature.

10 Particles A (1 kg) and B (5 kg) are joined by a light string over a smooth pulley (see diagram). A lies on a smooth slope, $\alpha = 30°$, and B is 3 m above the ground.
Released from rest, find the further distance A moves up the slope after B lands (A does not reach the pulley).

