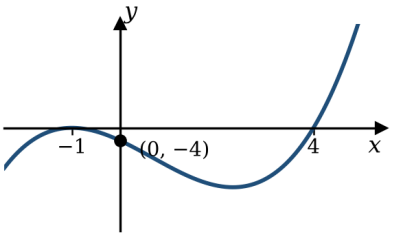
Day 149	A Level Maths: S Tier 10-a-day
1 Solve $3\cos 2\theta - 9\sin\theta - 6 = 0$ for $0 \leq \theta < 2\pi$, giving answers in terms of π.	
2 For events A and B, P(A) = 0.75, P(B) = 0.3 and P(A | B) = 0.75. (a) Find $P(A \cap B)$. (b) Find P(A | B′).	
3 A uniform plank AB of length 8 m and mass 30 kg rests on supports at C and D, where AC = 3 m and DB = 3 m. A girl of mass 40 kg stands on it at distance x m from A. Find the range of x for which the plank stays in equilibrium on both supports.	
4 (a) Show that $\cos^4\theta - \sin^4\theta \equiv \cos 2\theta$. (b) Hence solve $\cos^4\theta - \sin^4\theta = \frac{1}{4}$ for $0 \leq \theta < 360°$ (1 d.p.).	
5 Given that $\sqrt{15}$ is irrational, prove by contradiction that $\sqrt{3} + \sqrt{5}$ is irrational.	

Day 149 **A Level Maths: S Tier 10-a-day**

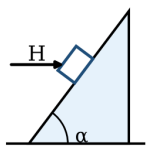
6 The tangent to $y = x\sqrt{5x - 6}$ at the point where $x = 2$
meets the axes at A and B. Find the exact area of triangle OAB,
where O is the origin.

7 Class S has 10 students with mean mark 35 and standard deviation 4. Class Q has 15 students with mean mark 67 and standard deviation 9.
(a) Find the mean mark of all 25 students.
(b) Find the standard deviation of all 25 students.

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 A particle of weight 170 N rests on a rough plane inclined at α to the horizontal, where $\tan\alpha = \frac{4}{3}$ and $\mu = 0.5$.
A horizontal force H N, in the vertical plane through a line of greatest slope, holds it in equilibrium. Find the range of possible values of H.



10 Solve $\sqrt{3x - 5} = x - 3$.