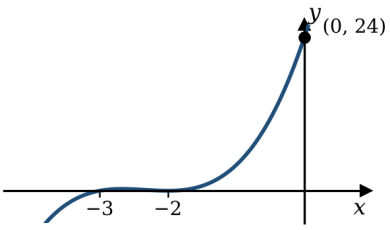
Day 22	A Level Maths: S Tier 10-a-day
1 $f(x) = \frac{kx - 4}{x - 5}$ for $x \neq 5$. Given that f is self-inverse, find k, and hence solve $f(x) = x$.	
2 A binomial random variable X has mean 16 and variance $\frac{16}{3}$. (a) Find n and p. (b) Find $P(X = 18)$, correct to 3 significant figures.	
3 A stone is projected from a point O on horizontal ground with speed 49 m s^{-1} at an angle α above the horizontal, where $\tan \alpha = \frac{4}{3}$. Find the horizontal distance between the two points at which the stone is 73.5 m above the ground. Take g = 9.8 m s^{-2}.	
4 One root of $x^2 + kx + 64 = 0$ is the square of the other root. Find the possible values of k.	
5 (a) Express $3 \sin \theta + 4 \cos \theta$ in the form $R \sin(\theta + \alpha)$, where $R > 0$ and $0 < \alpha < 90°$. Give α to 1 d.p. (b) Hence solve $3 \sin \theta + 4 \cos \theta = 3$ for $0 \leq \theta < 360°$, giving answers to 1 d.p.	

Day 22 **A Level Maths: S Tier 10-a-day**

6 A ball is projected from a point O on horizontal ground at 45° to the horizontal. The ball just passes over the top of a vertical wall of height 8.8 m, at a horizontal distance of 48 m from O. Find (a) the speed of projection, (b) the greatest height of the ball above the ground, to 3 s.f. Take g = 9.8 m s^{-2}.

7 The curve $y = x\sqrt{27 - x}$, for $0 < x < 27$, has one stationary point. Find its exact coordinates and determine its nature.

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 Find the exact coordinates of the point of inflection of
$y = (x + 2)e^{-x}$,
justifying that it is a point of inflection.

10 The tree diagram shows two games played in turn.

Given the second is a W, P(first was a W) = $\frac{1}{2}$.

Find x.

