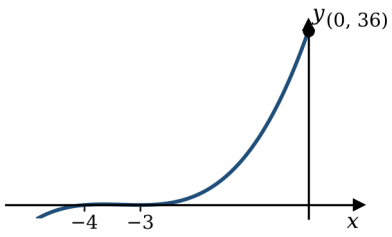
Day 336 **A Level Maths: S Tier 10-a-day**

1 Class Q has 24 students with mean mark 34 and standard deviation 3. Class P has 25 students with mean mark 72 and standard deviation 8.
(a) Find the mean mark of all 49 students.
(b) Find the standard deviation of all 49 students.

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



3 The curve $y = 3x^2\sqrt{80 - x}$, for $0 < x < 80$, has one
stationary point. Find its exact coordinates and determine its nature.

4 A lift of mass M kg, carrying a passenger of mass 65 kg, hangs from a vertical cable. The tension in the cable is 4429 N and the floor exerts a force of 559 N on the passenger. Find (a) the acceleration of the lift, with its direction, (b) the value of M. Take g = 9.8 m s^{-2}.

5 $f(x) = x^3 - 4x^2 + 7x - 12$.
Show that $(x - 3)$ is a factor of f(x), and that the equation f(x) = 0 has exactly one real root.

Day 336 **A Level Maths: S Tier 10-a-day**

6 A uniform plank AB of length 6 m and mass 60 kg rests on supports at C and D, where AC = 2 m and DB = 2 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.

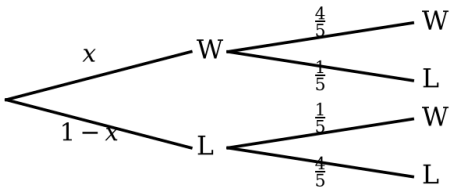
7 The curve C has equation $x^3 + xy^2 = 75$.
Find the equation of the tangent to C at the point (3, 4),
in the form ax + by + c = 0 with integers a, b, c.

8 Solve $\frac{3x - 1}{-x - 1} < -2$.

9 The tree diagram shows two games played in turn.

Given the second is a W, P(first was a W) = $\frac{4}{7}$.

Find x.



10 A population N satisfies $\frac{dN}{dt} = -0.005N^2$, with N = 50 when t = 0.
Find N when t = 16, and the time taken for N to halve.