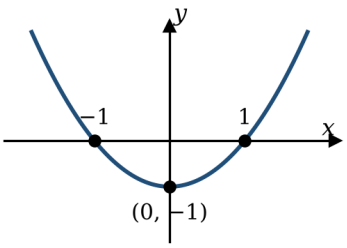
Day 33 **A Level Maths: B Tier 10-a-day**

1 A marble is projected vertically upwards from ground level with speed 39.2 m s^{-1}.
Take g = 9.8 m s^{-2}.
Find (a) the greatest height reached, (b) the total time before it returns to the ground.

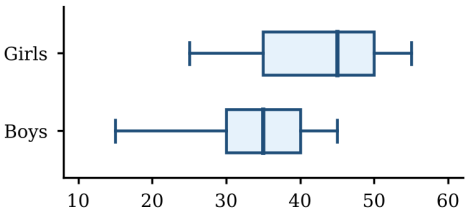
2 Values of y = f(x) are shown.
x: 0, 0.5, 1, 1.5, 2
y: 1.8, 2.2, 1.9, 0.8, 2.5
Estimate $\int_0^2 f(x)\,dx$ using the trapezium rule.

3 The diagram shows the curve y = f(x), a quadratic.
(a) Find the coordinates of the local maximum point of y = |f(x)|.
(b) How many solutions has |f(x)| = 3?



4 A particle moves in a straight line. At time t seconds its velocity is v = t^2 + 8t + 6 m s^{-1}.
Find the distance moved between t = 0 and t = 3. (The particle does not change direction.)

5 The box plots show the test scores for two groups.
(a) Find the interquartile range of each group.
(b) Compare the two distributions.



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6 The curve C has equation $y = x^2e^{3-3x} - 3$. Find the equation of the tangent to C at the point where $x = 1$, in the form $y = mx + c$.	
7 $X \sim B(30, p)$. H_0: $p = 0.25$ is to be tested against H_1: $p > 0.25$ at the 10% significance level. Find the critical region and the actual significance level.	
8 A curve has parametric equations $x = t^2 - t$, $y = 2t^3 - 3t^2$. Find the gradient at $t = -1$ and the equation of the normal there.	
9 Prove by contradiction that there are no integers x and y such that $x^2 - y^2 = 18$.	
10 The line $y = -7x + 37$ meets the circle $(x - 2)^2 + (y + 2)^2 = 25$ at the points A and B. Find the coordinates of A and B, and the exact length of the chord AB.	