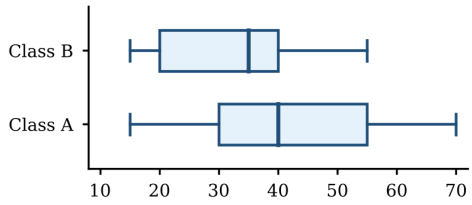
Day 74	A Level Maths: B Tier 10-a-day

1 A car moves in a straight line with constant acceleration. Its initial speed is 2 m s^{-1}, its acceleration is 2 m s^{-2} and the motion lasts 12 s.
Find the final speed.

2 A curve has parametric equations $x = 3t^2$, $y = 4t$, $t \in \mathbb{R}$.
Find a Cartesian equation of the curve.

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

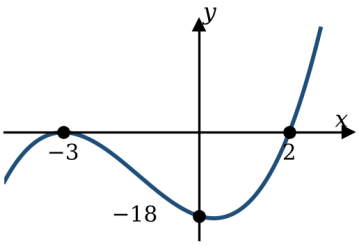


4 A curve has equation $xe^y - 2y = 3$.
Find $\frac{dy}{dx}$ in terms of x and y, and the gradient at (3, 0).

5 A block of mass 3 kg is projected along a rough horizontal surface with speed 7 m s^{-1} and comes to rest after sliding 10 m.
Take $g = 9.8$ m s^{-2}.
Use work and energy to find the coefficient of friction.

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6 The diagram shows a sketch of the curve y = f(x), where f is a cubic. The curve meets the axes at the labelled points. Find f(x) in factorised form.



7 The region R is bounded by the curve $y = e^{3x}$, the x-axis
and the lines x = 0 and x = 1.
R is rotated through 360° about the x-axis. Find the exact volume generated.

8 Given that each lottery ticket wins a prize independently with probability 0.1, find the least number of tickets needed for the probability of at least one success to exceed 0.99.

9 $\mathbf{a} = \begin{pmatrix} -1 \\ 5 \\ -3 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -1 \\ 5 \\ -1 \end{pmatrix}$.
Find the angle between a and b, to 1 d.p.

10 $f(x) = 2x^3 - 6x^2 + kx + 48$.
Given that $(x - 2)$ is a factor of f(x),
(a) find the value of k,
(b) factorise f(x) completely.