Day 114 **A Level Maths: B Tier 10-a-day**

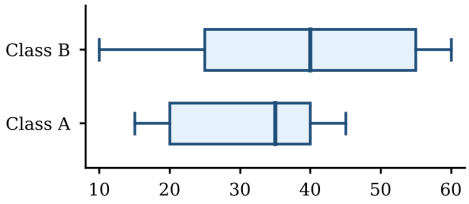
1 Points A and B have position vectors $\begin{pmatrix} -3 \\ -3 \\ 5 \end{pmatrix}$ and $\begin{pmatrix} -5 \\ -4 \\ 3 \end{pmatrix}$.

Find AB and the distance AB.

2 The box plots show the times taken (minutes) to complete a puzzle for two groups.

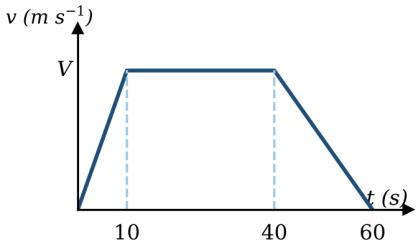
(a) Find the interquartile range of each group.

(b) Compare the two distributions.



3 A lift travels between floors in 60 s. The speed-time graph is a trapezium, with the maximum speed V m s^{-1} held from t = 10 to t = 40.

The floors are 450 m apart. Find V, and the deceleration in the final stage.



4 Solve $e^{-3x} = 23$, giving your answer to 3 s.f.

5 8 values of x are coded using $y = \frac{(x - 20)}{10}$.

$\Sigma y = -5$ and $\Sigma y^2 = 135$.

Find the mean and standard deviation of x (3 s.f.).

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6 Find the sum of all the multiples of 6 that lie between 139 and 462.	
7 Solve $2\cos^2 x + 1 - 3\cos x = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.	
8 A block of mass 2 kg is projected along a rough horizontal surface with speed 2.8 m s^{-1} and comes to rest after sliding 4 m. Take g = 9.8 m s^{-2}. Use work and energy to find the coefficient of friction.	
9 (a) Expand $(1 + 2x)^{\frac{1}{2}}$ up to the x^2 term. (b) Use x = 0.04 to estimate $\sqrt{1.08}$ to 5 decimal places.	
10 The diagram shows the curve y = f(x). A and B are the turning points. Find the turning points of: (a) y = f(x) − 2 (b) y = −f(x) 