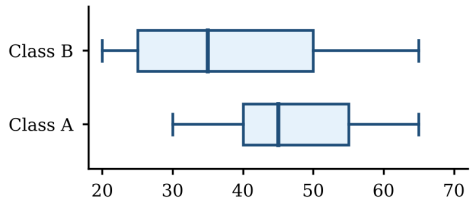
Day 316 **A Level Maths: B Tier 10-a-day**

1 Statement: "4n + 7 is prime for every positive integer n."
Show that this statement is false by finding a counter-example.

2 Two forces of magnitude 8 N and 15 N act at right angles on a particle.
Find the magnitude of the resultant, and the angle it makes with the 8 N force, to 1 d.p.

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 car of mass 1500 kg moves along a horizontal road. The engine works at a constant rate of 30 kW. The resistance to motion is constant at 600 N.
Find the acceleration when the speed is 8 m s^{-1}.

5 The depth of water at a pier is modelled by D = 11 + 4 $\sin(\frac{\pi t}{6})$, where t is in hours after noon.
Find (a) the greatest and least values, (b) the values of t with $0 \leq t \leq 12$ when it equals 9 m.

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6 Solve the equation $5^{2x} - 20\times5^{x} - 125 = 0$.	
7 A curve has parametric equations $x = t^2$, $y = t^3$. Find the gradient at $t = -2$ and the equation of the normal there.	
8 The line $12x + 5y = k$ is a tangent to the circle $(x - 1)^2 + (y + 2)^2 = 169$. Find the two possible values of k.	
9 The masses (kg) of parcels are normally distributed. $P(X < 88) = 0.1587$ and $P(X > 118) = 0.0668$. Find the mean and standard deviation (3 s.f.).	
10 Given that $2\cos\theta + 3\sin\theta \equiv \sqrt{13}\cos(\theta - 56.3°)$, solve $2\cos\theta + 3\sin\theta = -3$ for $0 \leq \theta \leq 360°$. (1 d.p.)	