Day 175	A Level Maths: B Tier 10-a-day
1 Given that $\cot\theta = \frac{1}{2}$ and θ is acute, find the exact value of $\operatorname{cosec}\theta$.	
2 A stone 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.	
3 Describe the single transformation that maps the graph of y = f(x) onto the graph of: (a) y = 3f(x) (b) y = f(2x)	
4 Find the exact value of $\int_1^2 (2x^2 + \frac{4}{x})\,dx$.	
5 A curve has parametric equations $x = 2t$, $y = 2t^2 - 4t - 2$, $t \in \mathbb{R}$. Find a Cartesian equation of the curve in the form y = f(x).	

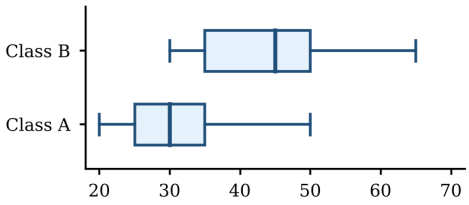
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6 $\mathbf{a} = \begin{pmatrix} -3 \\ 4 \\ 2 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 3 \\ 0 \\ -4 \end{pmatrix}$.
Find the angle between a and b, to 1 d.p.

7 The probability that a student passes a driving test first time is thought to be 0.2. In a sample of 30 students, 10 pass first time.
Test, at the 5% significance level, whether the probability is different from 0.2.

8 Find the term independent of x in the expansion of
$(2x + \frac{1}{x})^8$.

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



10 A javelin is projected from level ground with horizontal velocity component 26 m s^{-1} and vertical velocity component 34.3 m s^{-1} upwards.
Take g = 9.8 m s^{-2}.
Find (a) the time of flight, (b) the horizontal range.