Day 174	A Level Maths: C Tier 10-a-day
1 $x_{n+1} = (3x_n + 5)^{\frac{1}{3}}$, with $x_0 = 2$. Find x_1, x_2 and x_3 to 3 decimal places.	
2 $f(x) = 5x - 4$ and $g(x) = 2x + 2$. Find the value of $gf(0)$.	
3 Here are 6 values: 12, 17, 13, 16, 14, 17 Find the mean and the standard deviation, to 3 s.f.	
4 A line has equation $\mathbf{r} = \begin{pmatrix} 0 \\ 2 \\ 3 \end{pmatrix} + t\begin{pmatrix} 3 \\ -2 \\ 1 \end{pmatrix}$. Find the coordinates of the point on the line where $t = 3$.	
5 A particle of mass 5 kg is released from rest and falls 78.4 m. Take $g = 9.8$ m s^{-2}. Use energy to find (a) the loss in potential energy (3 s.f.), (b) the speed of the particle after falling 78.4 m.	

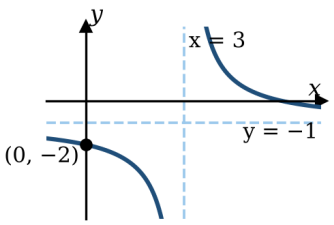
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6 Variables x and y satisfy $y = ax^n$. A graph of $\log_{10} y$ against $\log_{10} x$ is a straight line with gradient $\frac{3}{2}$ and intercept 1.1.

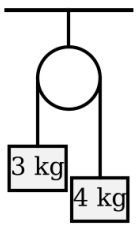
Find n and a, giving a to 3 significant figures.

7 For a data set $Q_1 = 36$ and $Q_3 = 52$.
A value is an outlier if it is more than 1.5 × IQR above Q_3 or below Q_1.
Determine whether 81 and 82 are outliers.

8 The diagram shows the graph of $y = \frac{k}{x - a} + c$ with its asymptotes. Find the values of a, c and k.



9 Two particles of masses 3 kg and 4 kg hang from the ends of a light inextensible string over a smooth pulley and are released from rest.
Take g = 9.8 m s^{-2}. Find the acceleration and the tension in the string.



10 Write $\frac{8 + \sqrt{2}}{\sqrt{2}}$ in the form $p\sqrt{2} + q$.