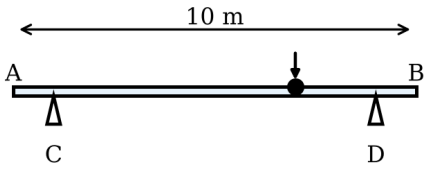
Day 334 **A Level Maths: B Tier 10-a-day**

1 $f(x) = 2x^3 + 6x^2 + kx$.
Given that $(x - 1)$ is a factor of f(x),
(a) find the value of k,
(b) factorise f(x) completely.

2 Items numbered 1 to 209; systematic sample of size 19.
(a) Find the sampling interval.
(b) The first item is number 3. Find the 6-th item.

3 A curve has equation $y = \frac{2}{x - 4} - 3$.
(a) Write down the asymptotes.
(b) Find where the curve crosses the axes.

4 A uniform beam AB of length 10 m and mass 40 kg rests horizontally on supports at C and D, where AC = 1 m and BD = 1 m.
A particle of mass 15 kg is placed on the beam 3 m from B. Take $g = 9.8$ m s^{-2}.
Find the reactions at C and D.



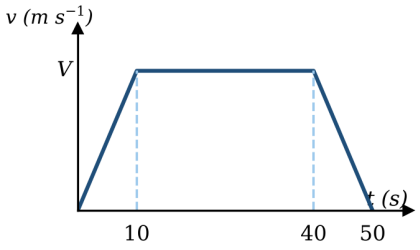
5 The table summarises 54 measurements of d.
(a) Estimate the mean.
(b) Estimate the median using linear interpolation.

d (cm)	Frequency
$0 \le d < 10$	9
$10 \le d < 20$	5
$20 \le d < 30$	14
$30 \le d < 40$	14
$40 \le d < 50$	12

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6 A curve has parametric equations
$x = 2t + 1$, $y = t^2 - 4$.
Find $\frac{dy}{dx}$ in terms of t, and the equation of the tangent at $t = -1$.

7 A lift travels between floors in 50 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 720 m apart. Find V, and the deceleration in the final stage.



8 Given that $3\cos\theta + 2\sin\theta \equiv \sqrt{13}\cos(\theta - 33.7°)$,
solve $3\cos\theta + 2\sin\theta = -1$ for $0 \leq \theta \leq 360°$.
(1 d.p.)

9 Solve $(x - 5)(x - 1)(x - 4) > 0$.

10 Line l_1: $\mathbf{r} = \begin{pmatrix} -4 \\ -5 \\ 2 \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ 2 \\ -1 \end{pmatrix}$.
Line l_2: $\mathbf{r} = \begin{pmatrix} -2 \\ -3 \\ 1 \end{pmatrix} + \mu \begin{pmatrix} 3 \\ 2 \\ 0 \end{pmatrix}$.
Show that l_1 and l_2 intersect and find the point.