Day 262 **A Level Maths: B Tier 10-a-day**

1 Points A and B have position vectors $\begin{pmatrix}1\\1\\0\end{pmatrix}$ and $\begin{pmatrix}-2\\13\\4\end{pmatrix}$.
Find AB and the distance AB.

2 The points A and B have coordinates $(0, -5)$ and $(-2, 1)$.
(a) Find the midpoint of AB.
(b) Find the line AB as $ax + by + c = 0$, with integer a, b, c.

3 A car travelling at 16 m s^{-1} brakes and comes to rest with constant deceleration 1.6 m s^{-2}.
Find (a) the distance travelled while braking, (b) the time taken to stop.

4 The table shows the number of siblings, x, of 32 students.
Calculate the mean and standard deviation (3 s.f.).

x	1	2	3	4
Frequency	8	4	10	10

5 A drone moves with constant velocity $(2\mathbf{i} - \mathbf{j})$ m s^{-1}. At time t = 0 its position vector relative to a fixed origin O is $(-3\mathbf{i} + 2\mathbf{j})$ m.
Find (a) its position vector when t = 4, (b) the value of t when it crosses the line through O in the direction of $\mathbf{i}$.

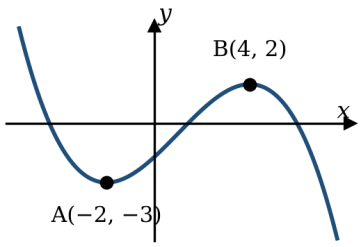
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6 Solve $12\cos^2 x + 1 - 7\cos x = 0$ for $0 \leq x \leq 360°$,
giving answers to 1 d.p. where necessary.

7 A class of width 10, frequency 36, is a bar 5 cm wide, 1.8 cm tall.
(a) Find the bar height for width 10, frequency 24.
(b) Find the frequency of a 3 cm by 3 cm bar.

8 A has position vector $\begin{pmatrix} 2 \\ 1 \\ 5 \end{pmatrix}$ and B has position vector $\begin{pmatrix} -3 \\ 16 \\ -5 \end{pmatrix}$.
The point P lies on AB with AP : PB = 2 : 3.
Find the position vector of P.

9 The diagram shows the curve y = f(x). A and B are the turning points. Find the turning points of:
(a) y = f(x + 3) (b) y = f(x) + 4



10 Express $\frac{x^2 - 15x - 61}{(x + 1)(x + 4)^2}$ in partial fractions.