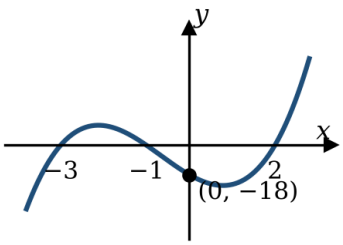
Day 20 **A Level Maths: C Tier 10-a-day**

1 $\text{OA} = \begin{pmatrix} -2 \\ -3 \\ 2 \end{pmatrix}$ and $\text{OB} = \begin{pmatrix} 0 \\ -14 \\ 12 \end{pmatrix}$.

Find AB and |AB|, and a unit vector in the direction of AB.

2 The diagram shows the curve y = f(x), where f(x) is a cubic. Find f(x) in the form $k(x - a)(x - b)(x - c)$.



3 For data set A, r = −0.35. For data set B, r = 0.95.

Which data set has the stronger linear correlation? Give a reason.

4 A box of mass 4 kg rests on rough horizontal ground. The coefficient of friction is 0.5.

Taking g = 9.8 m s^{-2}, find the maximum friction force that can act on the box.

5 X ~ B(n, p) has mean 12.8 and variance 2.56. Find n and p.

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6 A line has equation $\mathbf{r} = \begin{pmatrix} 3 \\ -1 \\ 3 \end{pmatrix} + t\begin{pmatrix} -1 \\ 2 \\ 2 \end{pmatrix}$. Show that the point (1, 3, 7) lies on the line.	
7 Find the set of values of k for which $x^2 + kx + 25 = 0$ has two distinct real roots.	
8 Use the substitution $u = \sin x$ to find $\int 2 \cos x \sin^4 x \, dx$.	
9 Write $x^2 + 6x$ in the form $(x + p)^2 + q$, and state the coordinates of the minimum point of $y = x^2 + 6x$.	
10 A particle moves with constant velocity $(2\mathbf{i} + 5\mathbf{j})$ m s^{-1}. It is at the point with position vector $(\mathbf{i} - 3\mathbf{j})$ m at t = 0. Find the time when its position vector is $(11\mathbf{i} + 22\mathbf{j})$ m.	