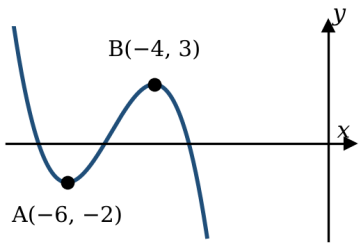
Day 15 **A Level Maths: B Tier 10-a-day**

1 The diagram shows the curve y = f(x). A and B are the turning points. Find the turning points of:

(a) $y = f(\frac{x}{2})$ (b) $y = 2f(x)$



2 A seed supplier says that 0.4 of seeds germinate. In a sample of 25 seeds, 13 germinate.
Test, at the 10% level, whether the true proportion is higher than claimed.

3 A particle is in equilibrium under three forces: P N at angle θ above the positive x-axis, a force of 16 N in the negative x-direction and a force of Q N in the negative y-direction.

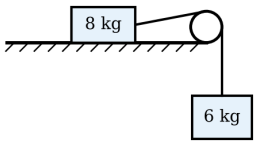
$\cos\theta = \frac{8}{17}$. Find P and Q.

4 A has position vector $\begin{pmatrix} 4 \\ -3 \\ -2 \end{pmatrix}$ and B has position vector $\begin{pmatrix} 4 \\ 0 \\ 4 \end{pmatrix}$.

The point P lies on AB with AP : PB = 1 : 2.
Find the position vector of P.

5 A curve has equation $y = \frac{5}{x+4} + 2$.

(a) Write down the asymptotes.
(b) Find where the curve crosses the axes.

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6 $f(x) = x^3 + 3x - 4$. Use the Newton-Raphson method with $x_0 = 1$ to find x_1 and x_2, to 4 d.p.	
7 A circle passes through A(−13, 3) and B(−5, −9), and its centre lies on the y-axis. Find the centre and the equation of the circle.	
8 A block of mass 8 kg lies on a rough horizontal table (coefficient of friction 0.5). It is joined by a light string over a smooth pulley to a particle of mass 6 kg hanging freely. Take $g = 9.8$ m s^{-2}. The system is released. Find the acceleration and the tension in the string. 	
9 (a) Write $\frac{-3}{(x+2)(x+5)}$ in partial fractions. (b) Hence evaluate $\int_0^4 \frac{-3}{(x+2)(x+5)}\,dx$, giving the answer as a single logarithm.	
10 A coin is thought to land heads with probability 0.25. It is tossed 30 times and lands heads 14 times. Test, at the 5% significance level, whether the probability of heads is different from 0.25.	