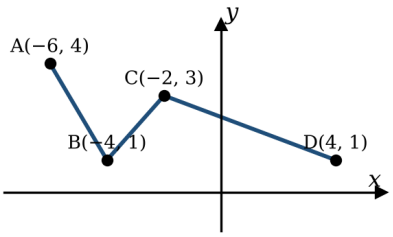
Day 354 **A Level Maths: S Tier 10-a-day**

1 The diagram shows y = f(x), made of three straight line segments. Find the coordinates of the images of A, B, C and D on the graph of y = 3f(−x + 1).



2 Solve $\cos 2\theta - \sin\theta = 0$
for $0 \leq \theta < 2\pi$, giving answers in terms of π.

3 A curve has parametric equations
$x = 3t - 4$, $y = \frac{1}{t} + 2$, $t \neq 0$.
Find a Cartesian equation of the curve.

4 A curve has parametric equations $x = t^2$, $y = 2t^3 + 12t$.
Find the coordinates of the points on the curve where
the gradient is 9.

5 A car of mass 1200 kg tows a trailer of mass 400 kg along a horizontal road, with driving force 2000 N. Resistances are 800 N on the car and 400 N on the trailer.
(a) Find the tension in the tow bar. At 12 m s^{-1} the tow bar breaks. (b) Find the distance between car and trailer when the trailer stops.

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6 A coin is said to score a hit with probability 0.4. In 25 trials it does so 3 times. Test at the 10% level whether the probability is different from 0.4.	
7 A particle P moves on a line. Its displacement from a fixed point O at time t seconds is s metres, where $s = 5 \sin 3t + 12 \cos 3t$. Find (a) the greatest distance of P from O, (b) the greatest speed of P, (c) the first time P is at its greatest distance from O (3 s.f.).	
8 Solve $\lvert -4x + 1 \rvert < \lvert -2x + 5 \rvert$.	
9 Find the coordinates of the points of inflection of $y = \frac{1}{x^2 + 3}$.	
10 The cdf of X is $F(x) = 0$ for $x < 0$, $F(x) = \frac{x^4}{256}$ for $0 \leq x \leq 4$, and $F(x) = 1$ for $x > 4$. (a) Find the pdf of X. (b) Find E(X). (c) Find $P(1 < X < 2)$ and the median, to 3 significant figures.	