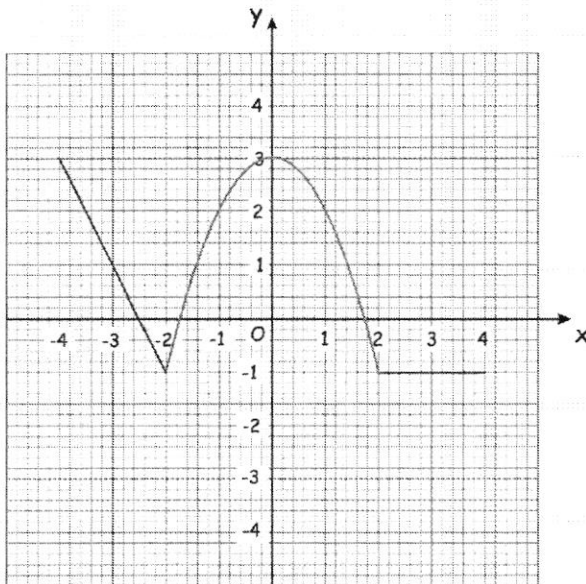


10th December



Corbettmaths



Define  $f(x)$ , stating clearly the domain for each part.

$$\begin{aligned} f(x) &= -2x - 5 & -4 \leq x < -2 \\ &= 3 - x^2 & -2 \leq x < 2 \\ &= -1 & 2 \leq x \leq 4 \end{aligned}$$

The curve C has equation  
 $y = 3x^4 - 12x^3 + 2$

Find  $\frac{dy}{dx}$

$$\underline{12x^3 - 36x^2}$$

Find  $\frac{d^2y}{dx^2}$

$$\underline{36x^2 - 72x}$$

Show that C has a stationary point when  $x = 3$  and state the nature of this stationary point

$$\begin{aligned} x=3 \Rightarrow \frac{dy}{dx} &= 12 \times 3^3 - 36 \times 3^2 \\ &= 12 \times 27 - 36 \times 9 = \underline{0} \\ \frac{d^2y}{dx^2} &= 36 \times 3^2 - 72 \times 3 \\ &= 108 > 0 \\ &\Rightarrow \underline{\text{MIN}} \end{aligned}$$