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## Differentiation: Increasing & Decreasing Functions

Find the range of values of  $x$  for which  $y = x^3 + 5x^2 - 8x + 1$  is increasing.

Now  $\frac{dy}{dx} = 3x^2 + 10x - 8$


$\therefore$  when  $y$  is increasing  $\frac{dy}{dx} > 0$

$\therefore 3x^2 + 10x - 8 > 0$

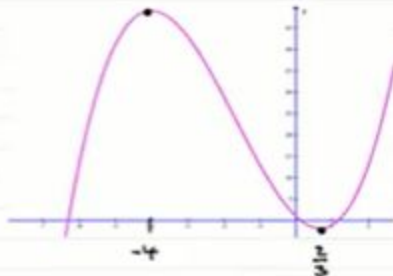
$\therefore (3x - 2)(x + 4) > 0$

$\therefore$  critical values  $x = \frac{2}{3}$  or  $x = -4$

$f(x) = (3x - 2)(x + 4)$

  $x < -4$  or  $x > \frac{2}{3}$

$\therefore y$  is increasing for  $x < -4$  or  $x > \frac{2}{3}$



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