

Example 4: $y - y_1 = m(x - x_1)$

Write the equation of a line tangent to $y = -2x^2$ at $x = 1$

What two things do we need to write the equation of a line?

1. Slope \Rightarrow derivative $f(x) = -2x^2$
 2. point $(1, -2)$

$$\lim_{h \rightarrow 0} \frac{-2(x+h)^2 - (-2x^2)}{h} = -2$$

$$\lim_{h \rightarrow 0} \frac{-2x^2 - 4xh - 2h^2 + 2x^2}{h} = \frac{h(-4x - 2h)}{h}$$

$$= -4x \quad f'(x) = -4x$$

$$f'(1) = -4(1) = -4$$

$(1, -2) \quad m = -4$

$$y - (-2) = -4(x - 1)$$

$$y + 2 = -4x + 4$$

$$y = -4x + 2$$

$$f(x) = 3x^2 - 5x$$

$$f'(x) = 6x - 5$$

Find the **EQUATION OF THE TANGENT LINE**

1. Slope \Rightarrow at $x = -1$.
 $f'(-1) = 6(-1) - 5 = -11$

2. point $(-1, 8)$
 $f(-1) = 3(-1)^2 - 5(-1) = 8$

$$y - 8 = -11(x - (-1))$$

$$y = -11x - 3$$

$$y = 3/x$$
$$y' = -3x^{-2} = \frac{-3}{x^2}$$

Find the equation for the tangent line at $(1, 3)$.

$$m = -3$$
$$(1, 3)$$

$$y - 3 = -3(x - 1)$$

$$y - 3 = -3x + 3$$

$$y = -3x + 6$$

Attachments

Graph 2.1 Limit Tangent Line.tii

Define Derivative & NDER.gsp