

3-21-14  
3<sup>rd</sup> Trig

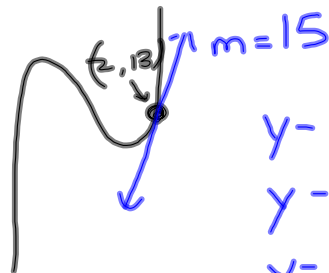
Ch. 7 Review

- ① Give the slope of the line that is tangent to  $f(x) = x^3 + 3x - 1$  at  $(2, 13)$ .

$$f'(x) = 3x^2 + 3$$

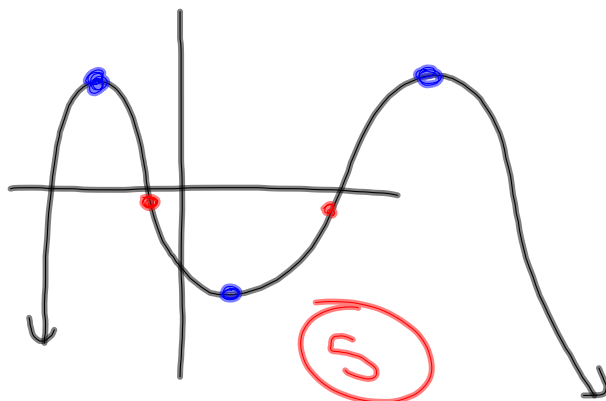
$$f'(2) = 3 \cdot 2^2 + 3 = \boxed{15}$$

- ② Now give the equation of this tangent line.



$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 13 &= 15(x - 2) \\ y - 13 &= 15x - 30 \\ \underline{\quad + 13 \quad \quad + 13} & \\ y &= 15x - 17 \end{aligned}$$

How many critical points  
on



Find critical points

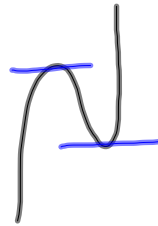
$$\text{on } f(x) = x^3 - 2x^2$$

$$f'(x) = 3x^2 - 4x$$

$$3x^2 - 4x = 0$$

$$x(3x - 4) = 0$$

$$x = 0 \quad \text{or} \quad \frac{3x \cdot 4 = 0}{3x = 4}$$
$$x = \frac{4}{3}$$



$$f(0) = 0^3 - 2(0)^2 = 0$$
$$(0, 0)$$

$$f\left(\frac{4}{3}\right) = \left(\frac{4}{3}\right)^3 - 2\left(\frac{4}{3}\right)^2$$
$$\frac{64}{27} - \frac{2}{1} \cdot \frac{16}{9}$$
$$\frac{64}{27} - \frac{32}{9}$$
$$\frac{64}{27} - \frac{96}{27} = \frac{-32}{27} \left(-\frac{32}{27}\right)$$
$$\left(\frac{4}{3}, \frac{-32}{27}\right)$$

Point of Inflection

$$f''(x) = 6x - 4$$

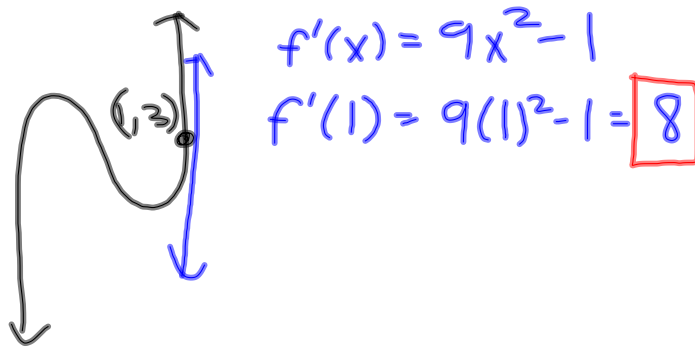
$$6x - 4 = 0$$

$$x = \frac{2}{3}$$

$$f\left(\frac{2}{3}\right) = \left(\frac{2}{3}\right)^3 - 2\left(\frac{2}{3}\right)^2$$
$$\frac{8}{27} - \frac{2}{1} \cdot \frac{4}{9}$$
$$\frac{8}{27} - \frac{8}{9}$$
$$\frac{8}{27} - \frac{24}{27} = \frac{-16}{27}$$
$$\left(\frac{2}{3}, \frac{-16}{27}\right)$$

3-21-14  
4<sup>th</sup> Trig

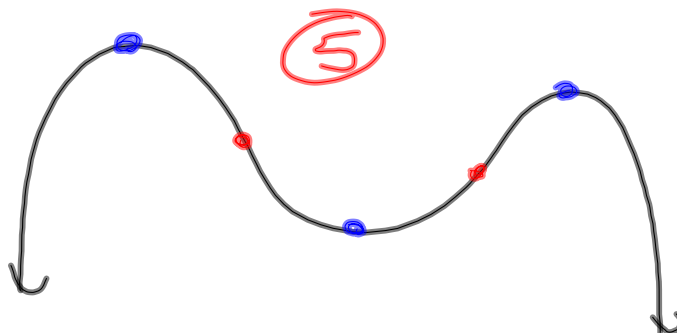
- ① Give the slope of the line tangent to  $f(x) = 3x^3 - x + 1$  at  $(1, 3)$ .

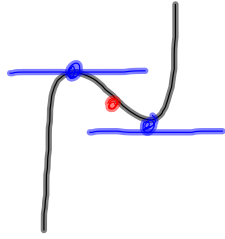


- ② Give equation of that tangent line.

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 3 &= 8(x - 1) \\ y - 3 &= 8x - 8 \\ \underline{+3} \quad \quad \underline{+3} \\ y &= 8x - 5 \end{aligned}$$

How many critical points are on the graph below?





Find critical points for  
 $f(x) = x^3 - 2x^2$

$$f'(x) = 3x^2 - 4x$$

$$3x^2 - 4x = 0$$

$$x(3x - 4) = 0$$

$$x = 0 \qquad 3x - 4 = 0$$

$$x = \frac{4}{3}$$

$$f(0) = 0^3 - 2(0)^2 = 0$$

$$(0, 0)$$

$$f\left(\frac{4}{3}\right) = \left(\frac{4}{3}\right)^3 - 2\left(\frac{4}{3}\right)^2 \approx -1.2$$

$$\left(\frac{4}{3}, -1.2\right)$$

Point of Inflection

$$f''(x) = 6x - 4$$

$$6x - 4 = 0$$

$$x = \frac{2}{3}$$

$$f\left(\frac{2}{3}\right) = \left(\frac{2}{3}\right)^3 - 2\left(\frac{2}{3}\right)^2 \approx -0.6$$

$$\left(\frac{2}{3}, -0.6\right)$$