

3-20-14
3rd Trig

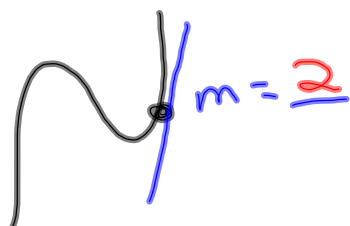
Ch. 7 Review

Derivatives

① $2x^{-4} - 8x^{-2}$
 $f'(x) = -8x^{-5} + 16x^{-3}$
 $= \frac{-8}{x^5} + \frac{16}{x^3}$

② $f(x) = \frac{3}{x^3} + \frac{x^2}{4}$
 $= 3x^{-3} + \frac{1}{4}x^2$
 $f'(x) = -9x^{-4} + \frac{1}{2}x$
 $= \frac{-9}{x^4} + \frac{x}{2}$

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

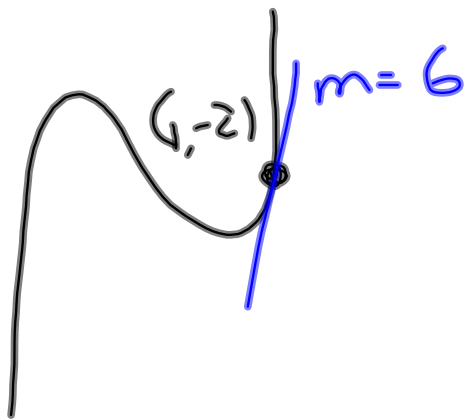


$f'(x) = 3x^2 - 1$
 $f'(1) = 3(1)^2 - 1 = 2$

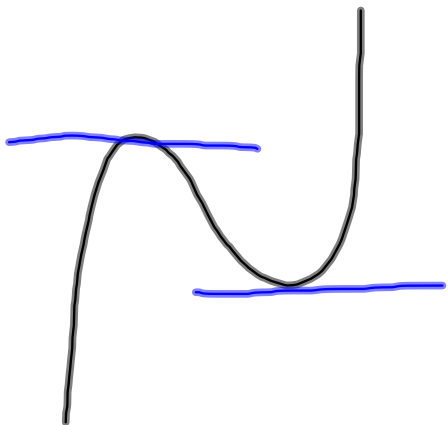
④ Give the equation of the tangent line to $f(x) = 2x^3 - 4$ at $(1, -2)$.

$$f'(x) = 6x^2$$

$$f'(1) = 6 \cdot 1^2 = 6$$



$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y + 2 &= 6(x - 1) \\ y + 2 &= 6x - 6 \\ \begin{array}{r} -2 \quad \quad -2 \\ \hline y = 6x - 8 \end{array} \end{aligned}$$



Find critical points on
 $f(x) = x^3 + 6x^2 + 9x$

$$f'(x) = 3x^2 + 12x + 9$$

$$3x^2 + 12x + 9 = 0$$

$$\frac{\cancel{3}(x^2 + 4x + 3)}{\cancel{3}} = \frac{0}{\cancel{3}}$$

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

$$(x+3)(x+1) = 0$$

$$x = -3 \quad x = -1$$

$$f(-3) = (-3)^3 + 6(-3)^2 + 9(-3)$$

$$\boxed{(-3, 0)} = 0$$

$$f(-1) = (-1)^3 + 6(-1)^2 + 9(-1)$$

$$\boxed{(-1, -4)} = -4$$

$$f''(x) = 6x + 12$$

$$6x + 12 = 0$$

$$x = -2$$

$$f(-2) = (-2)^3 + 6(-2)^2 + 9(-2)$$

$$\boxed{(-2, -2)}$$

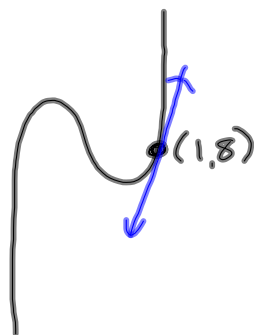
3-20-14
4th Trig

Ch. 7 Review

Derivatives

$$\begin{aligned}\textcircled{1} f(x) &= 2x^{-8} + x^{-1} \\ f'(x) &= -16x^{-9} - 1x^{-2} \\ &= \frac{-16}{x^9} - \frac{1}{x^2}\end{aligned}$$

$$\begin{aligned}\textcircled{2} f(x) &= \frac{2}{x^4} + \frac{3}{x^9} - \frac{x^2}{2} \\ &= 2x^{-4} + 3x^{-9} - \frac{1}{2}x^2 \\ f'(x) &= -8x^{-5} - 27x^{-10} - x \\ &= \frac{-8}{x^5} - \frac{27}{x^{10}} - x\end{aligned}$$



$\textcircled{3}$ What is the slope of the line tangent to $f(x) = x^3 + 8x - 1$ at $(1, 8)$

$$\begin{aligned}f'(x) &= 3x^2 + 8 \\ f'(1) &= 3 \cdot 1^2 + 8 = 11\end{aligned}$$

④ Give the equation of the line that is tangent to $f(x) = 2x^3 - 8x$ at $(\underline{1}, \underline{-6})$

$$f'(x) = 6x^2 - 8$$

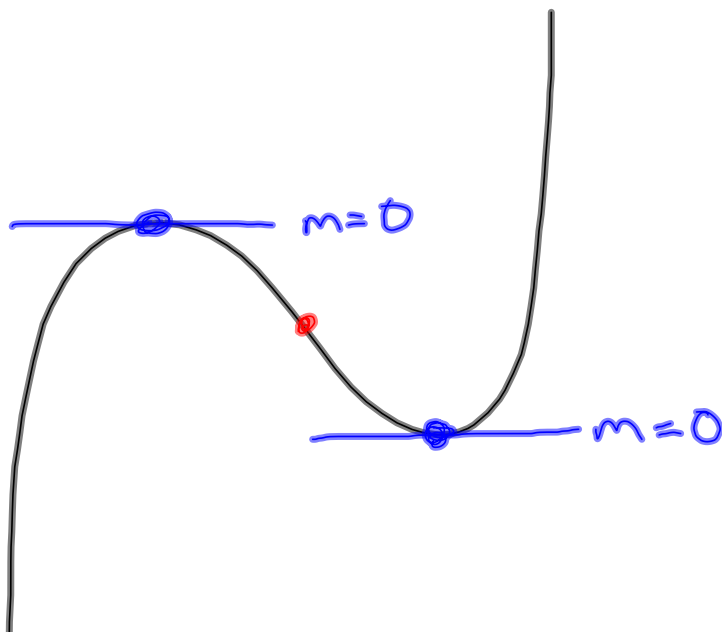
$$f'(1) = 6 \cdot 1^2 - 8 = \underline{-2}$$

$$y - \underline{y_1} = \underline{m}(x - \underline{x_1})$$

$$y + 6 = -2(x - 1)$$

$$y + 6 = -2x + 2$$

$$\begin{array}{r} -6 \\ \hline y = -2x - 4 \end{array}$$



Give critical points for

$$f(x) = x^3 + 6x^2 + 9x.$$

$$f'(x) = 3x^2 + 12x + 9$$

$$3x^2 + 12x + 9 = 0$$

$$\cancel{3}(x^2 + 4x + 3) = 0$$

$$(x+3)(x+1) = 0$$

$$x = -3 \quad x = -1$$

$$\begin{aligned} f(-3) &= (-3)^3 + 6(-3)^2 + 9(-3) \\ &= 0 \quad (-3, 0) \end{aligned}$$

$$\begin{aligned} f(-1) &= (-1)^3 + 6(-1)^2 + 9(-1) \\ &= -4 \quad (-1, -4) \end{aligned}$$

$$f''(x) = 6x + 12$$

$$6x + 12 = 0$$

$$x = -2$$

$$\begin{aligned} f(-2) &= (-2)^3 + 6(-2)^2 + 9(-2) \\ &= -2 \quad (-2, -2) \end{aligned}$$