#7 $\frac{1}{5}x^5 - \frac{8}{3}x^3 + 16x = f(x)$ §3.5

$\mathcal{D} = \mathbb{R}$

$15\left[\frac{1}{5}x^5 - \frac{8}{3}x^3 + 16x\right]$

$= 3x^4 - 40x +$

$16 \cdot 15 = 160 + 80 = 240$

Asymptotes: None.

$f(0) = 0 \rightsquigarrow (0,0)$ y-int.

$f(x) = 0 \Rightarrow$

$\frac{1}{5}x^5 - \frac{8}{3}x^3 + 16x = 0$?

$\Rightarrow \frac{1}{15}x\left[3x^4 - 40x^2 + 240\right] = 0$

$\Rightarrow \frac{1}{15}x = 0 \Rightarrow \boxed{x = 0}$

$256 - 16 = 240$

OR $x^4 - 8x^2 + 16$

Quartic that's Quadratic in form.

$u = x^2 \Rightarrow$

$3u^2 - 40u + 240 = 0$

$b^2 - 4ac = (-40)^2 - 4(3)(240)$

$= 1600 - 2880$

$240 \cdot 3 = 720$, $720 \cdot 4 = 2880$

$720 = 2 \cdot 360 = 2 \cdot 180 = 2 \cdot 90 = 2 \cdot 45 = 3 \cdot 15 = 3 \cdot 5$

$x^4 - 8x^2 + 16$ is $f'(x)$

$(x^2 - 4)^2 = ((x-2)(x+2))^2 = (x-2)^2(x+2)^2$

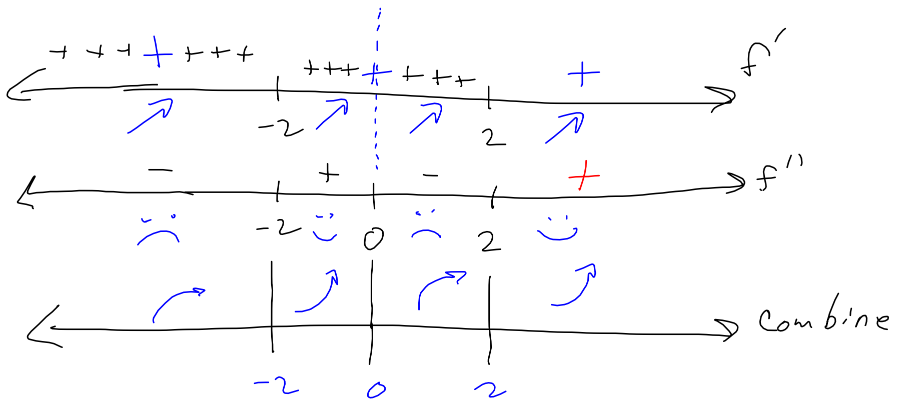
$(2, 0)$

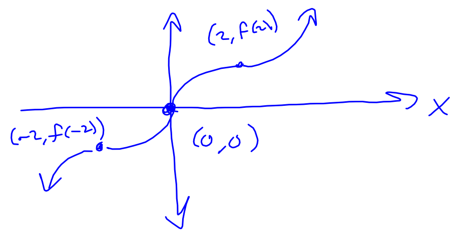
$f'(x) = 0 \Rightarrow x = \pm 2$

$f''(x) = 4x^3 - 16x \overset{\text{SET}}{=} 0$

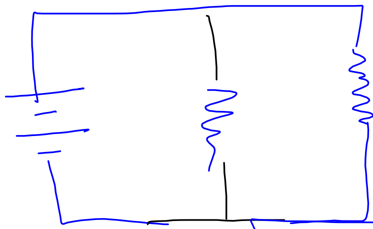
$\Rightarrow 4x\left[x^2 - 4\right] = 4x\left[(x-2)(x+2)\right]$

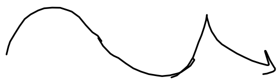
$x = 0, \ x = \pm 2$





§ 3.6 Apps – $f'(x) = 0$ & Solve.



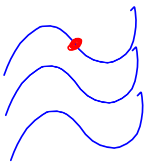


§ 3.7 – Calculator Stuff – Lightly

§ 3.8 – Newton's is COOL!

§ 3.9 – Antiderivatives

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

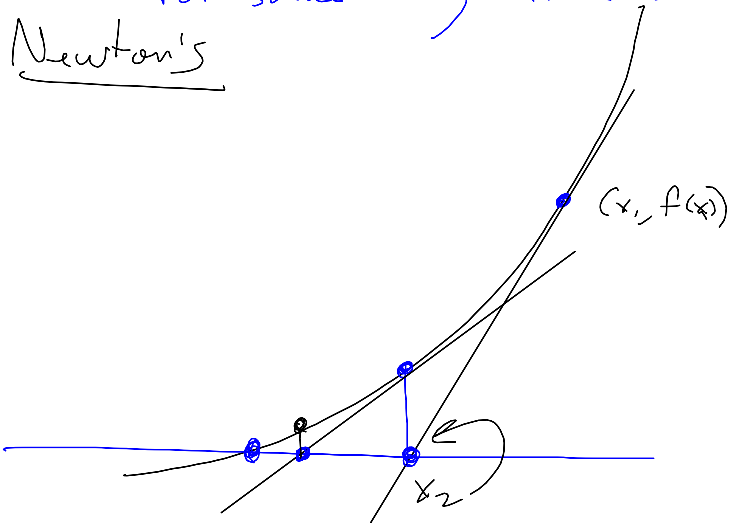


$$\Rightarrow f'(x) = x^4 - 8x^2 + 16$$

17+

For something like $3\sin x + x = 0$

Newton's



Tan line to f @ x_1 is

$m(x-x_1)+y_1$

$$y = f'(x_1)(x-x_1) + f(x_1) \overset{\text{SET}}{=} 0$$

$$\Rightarrow f'(x_1)x - f'(x_1)x_1 = -f(x_1)$$

$$f'(x_1)x = f'(x_1)x_1 - f(x_1)$$

$$x_2 = \frac{f'(x_1)x_1 - f(x_1)}{f'(x_1)} = \boxed{x_1 - \frac{f(x_1)}{f'(x_1)} = x_2}$$