

§ 4.6 #2

$$f(x) = x^6 - 15x^5 + 75x^4 - 125x^3 - x$$

$$f'(x) = 6x^5 - 75x^4 + 300x^3 - 375x^2 - 1$$

$$f''(x) = 30x^4 - 300x^3 + 900x^2 - 750x$$

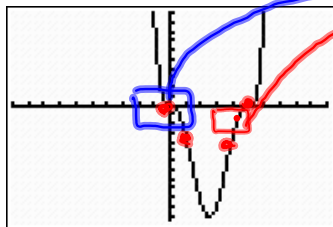
(0,0) right off



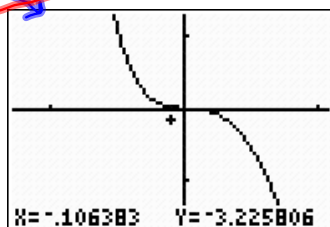
Quick Graphs:

f(x): E.B. ↑ ... ↑

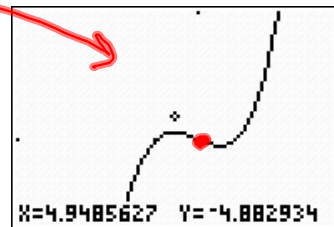
Max # of extremes: 5



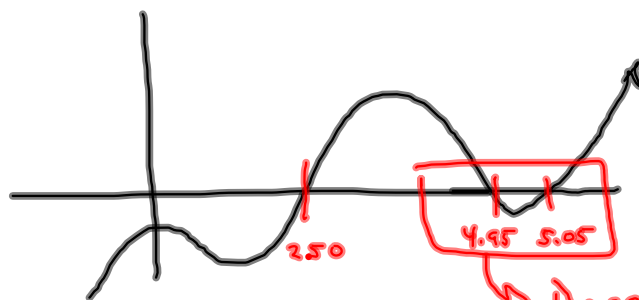
[-10, 10] x [250, 300]



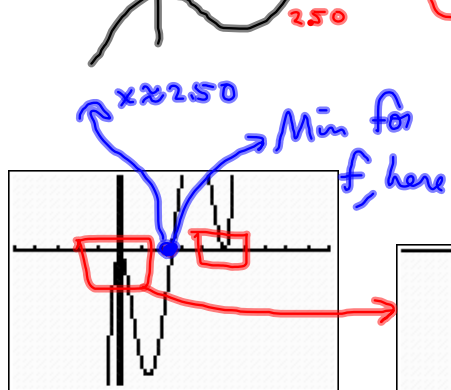
[1.3, 1.1] x [-32.3, 25.8]



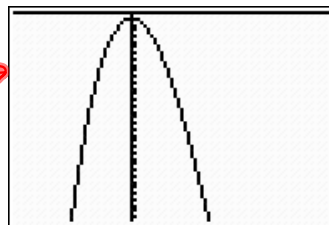
Quick graph of $f'(x)$



f is increasing on
 $(2.50, 4.95) \cup (5.05, \infty)$
 decreasing
 $(-\infty, 2.50) \cup (4.95, 5.05)$

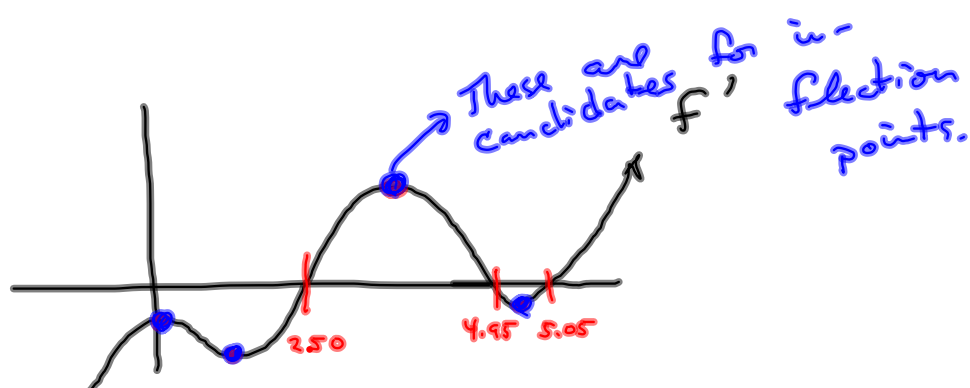


Doesn't show up if
 you're tall enough to catch
 the big stuff.

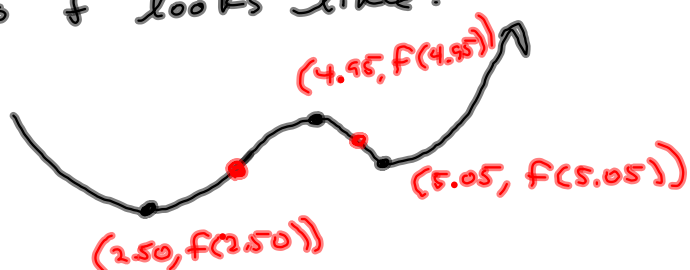


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WINDOW
Xmin=-.5319148
Xmax=.904255319
Xscl=1
Ymin=-35.483871
Ymax=0
Yscl=1
Xres=1
  
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So f looks like:



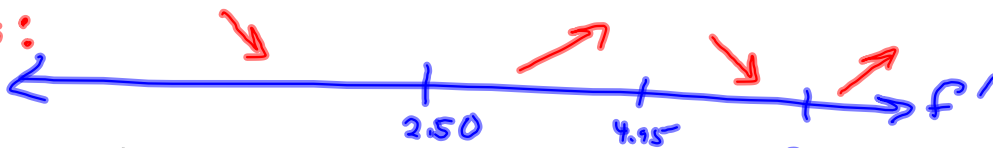
$$f''(x) = 30x^4 - 300x^3 + 900x^2 - 750x$$

$$Set = 0 \Rightarrow$$

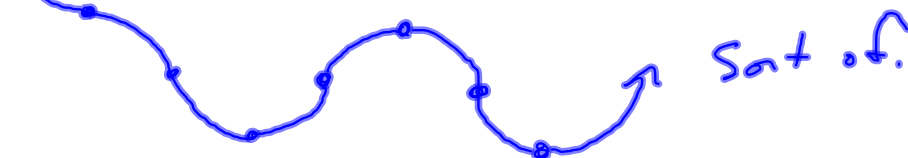
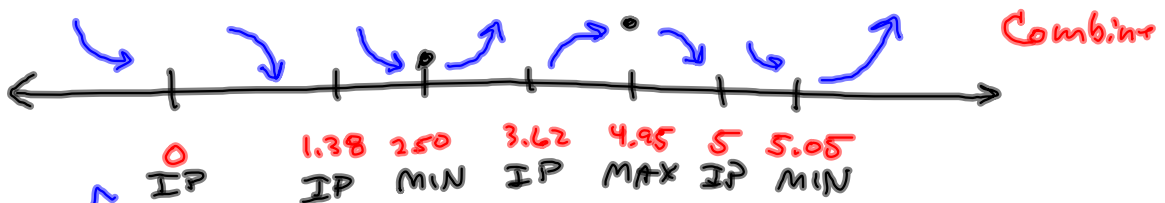
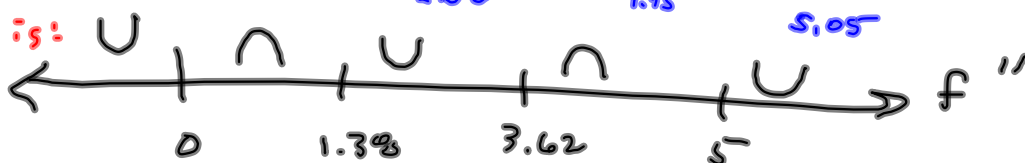
$x \approx 0, 1.38, 3.62, 5$ by finding zeros with my TI-84 Plus SILVER EDITION!
Quick f'' sketch:



So f' is:



So f is:



Sort of.

$$A = (0,0) \text{ IP}$$

$$B = (1.38, -126.1) \text{ IP}$$

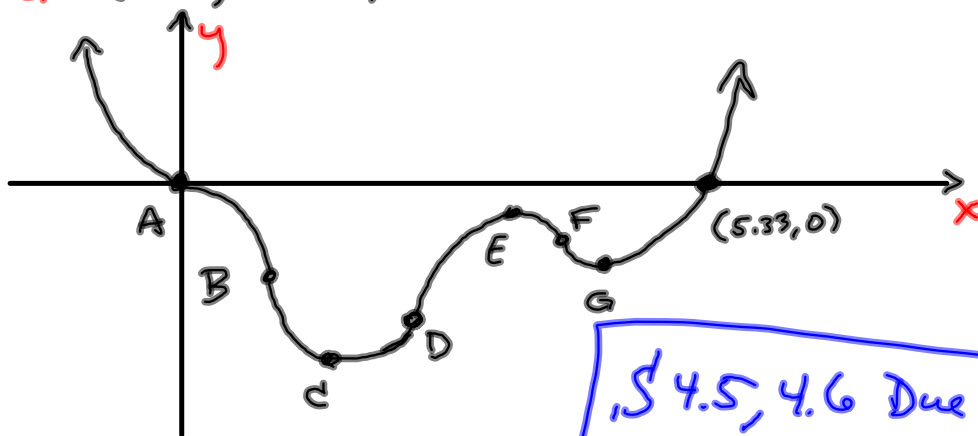
$$C = (2.50, -246.6) \text{ MIN}$$

$$D = (3.62, -128.3) \text{ IP Lower than B}$$

$$E = (4.95, -4.965) \text{ MAX}$$

$$F = (5, -5) \text{ IP}$$

$$G = (5.05, -5.034) \text{ MIN Higher than B}$$



§ 4.5, 4.6 Due
Friday

$$(7) \quad f(x) = 2x^5 - 5x^2 + 1$$

$$f'(x) = 10x^4 - 10x \quad \underline{\underline{\text{SET } 0}}$$

$$\Rightarrow 10x(x^3 - 1) = 10x(x-1)(x^2 + x + 1) = 0$$

$$\Rightarrow x \in \{0, 1\}$$

So f is

$$f''(x) = 40x^3 - 10 \quad \underline{\underline{\text{SET } 0}}$$

$$\Rightarrow 10(4x^3 - 1) = 0 \Rightarrow x^3 = \frac{1}{4} \Rightarrow x = \sqrt[3]{\frac{1}{4}}$$

$$4x^3 - 1 = (\sqrt[3]{4}x - 1)(\sqrt[3]{4}^2 + \sqrt[3]{4}x + 1)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

So f is

Still some work to do

Find y -values. &/or do decimal approximations for the x -values.

$$\frac{1}{\sqrt[3]{4}} \cdot \frac{\sqrt[3]{4^2}}{\sqrt[3]{4^2}} = \frac{\sqrt[3]{16}}{4}$$