

Curve Sketching

Goal:
<ul style="list-style-type: none"> Can graph a polynomial accurately to include local extrema, inflection points, correct concavity and slope and correct y-intercept and zeros.
Terminology:
<ul style="list-style-type: none"> None
Reminder:
<ul style="list-style-type: none"> Test on Wednesday February 26th

Find the local extrema, inflection points and zeros of the following polynomial.

$$f(x) = \frac{x^4}{4} - x^3 + 3$$

Extrema at $x = \dots$	Inflection points at $x = \dots$	Zeros at $x = \dots$
0 ← not an extrema	0	1.74...
3	2	3.77...

$$f'(x) = x^3 - 3x^2 = x^2(x-3) = 0 \Rightarrow x=3$$

@ $x=0$ $f'(x)$ does not change sign

$$f''(x) = 3x^2 - 6x = 3x(x-2) = 0$$

$$x = 0, 2$$

Zeros using newtons

$$x = \frac{-\frac{A^4}{4} + A^3 - 3}{A^3 - 3A^2} + A$$

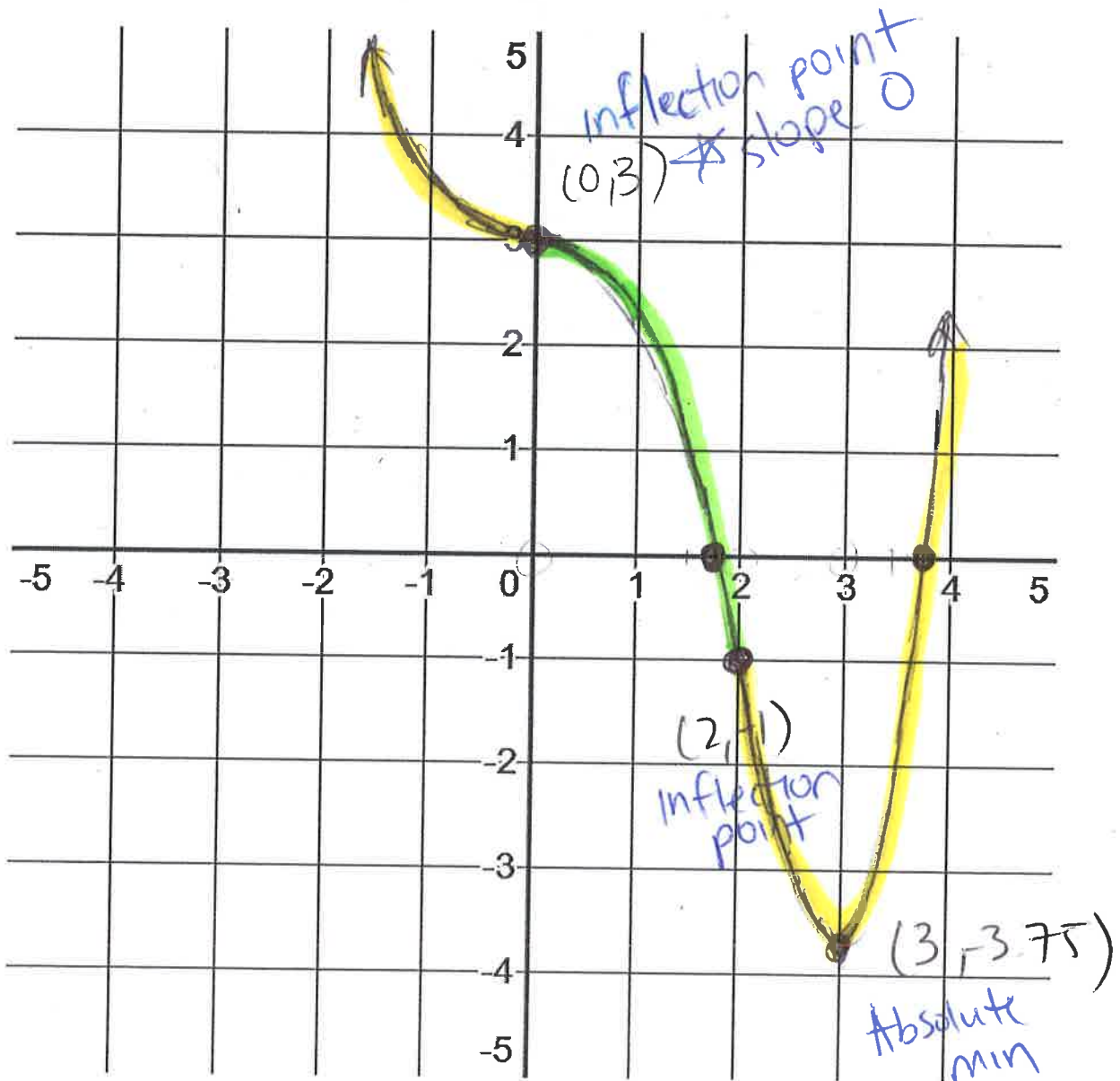
$$\rightarrow \text{find } x = 1.746 \dots$$

$$x = 3.777 \dots$$

$$f(x) = \frac{x^4}{4} - x^3 + 3 \quad \text{curve}$$

Extrema at $x = \dots$	Inflection points at $x = \dots$	Zeros at $x = \dots$
3	0	1.746...
	2	3.777...

Putting it all together we can sketch a very good looking polynomial.



Practice Problems: 5.5: # 2, 4, 6-9, 12 Sketch the graphs with correct intercepts, asymptotes, local extrema and inflection points.

5.7: # 5-7