MA 16010 LESSONS 20 GRAPHICAL INTERPRETATION OF DERIVATIVES

So far, we have learned that:

<u>x-value</u>	**1. Critical Point/Number:**	x-values where $f'(x) = 0$ or $f'(x)$ DNE
<u>interval</u>	**2. Increasing:**	$f'(x) > 0$
<u>interval</u>	**3. Decreasing:**	$f'(x) < 0$
<u>x-value</u>	**4. Relative Max:**	Create # line from (2) and (3), and then use First Derivative Test
<u>x-value</u>	**5. Relative Min:**	
<u>interval</u>	**6. Concave Up:**	$f''(x) > 0$
<u>interval</u>	**7. Concave Down:**	$f''(x) < 0$
<u>x-value</u>	**8. Inflection Point:**	Check for change of concavity from results of (6) and (7)

1. Given the graph of $f'(x)$ below, answer the following question for $f(x)$.
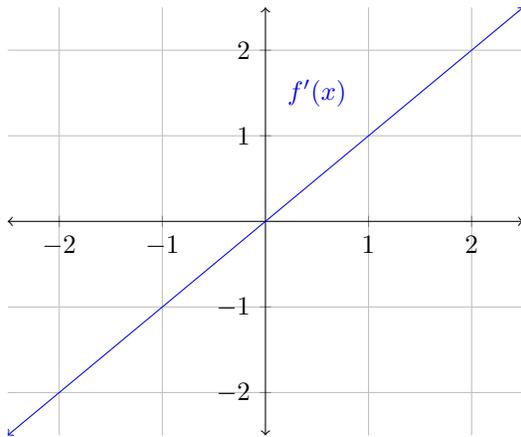
$f'(x)$

(a) **Critical Number(s):**

(b) **Increasing Interval(s):**

(c) **Decreasing Interval(s):**
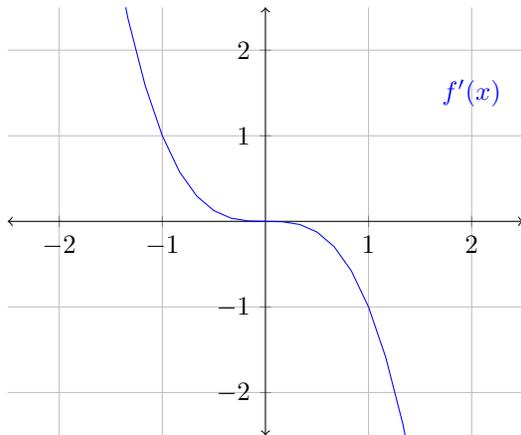
(d) **Relative Maximum Occurs:**

(e) **Relative Minimum Occurs:**

(f) **Concave Up Interval(s):**

(g) **Concave Down Interval(s):**

(h) **Inflection Point(s):**

2. Given the graph of $f'(x)$ below, answer the following question for $f(x)$.

$f'(x)$

(a) **Critical Number(s):**

(b) **Increasing Interval(s):**

(c) **Decreasing Interval(s):**

(d) **Relative Maximum Occurs:**

(e) **Relative Minimum Occurs:**

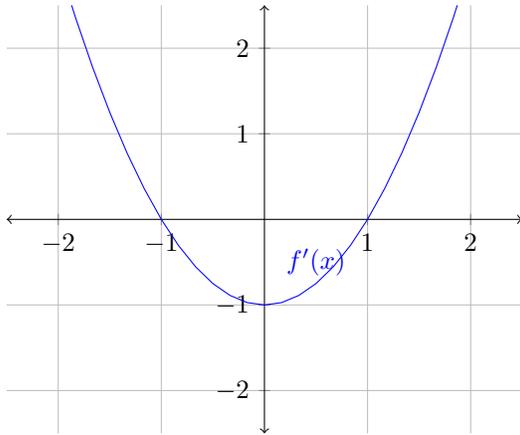(f) **Concave Up Interval(s):**

(g) **Concave Down Interval(s):**

(h) **Inflection Point(s):**

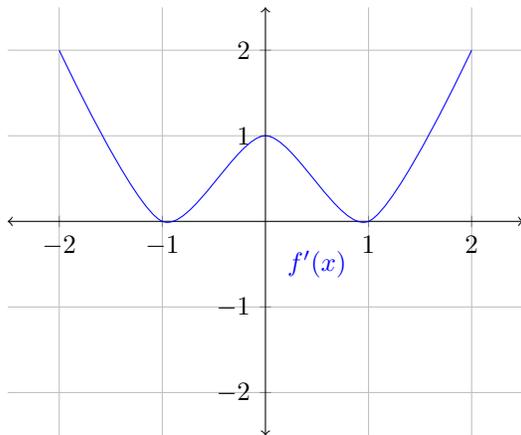3. Given the graph of $f'(x)$ below, answer the following question for $f(x)$.

$f'(x)$

(a) **Critical Number(s):**

(b) **Increasing Interval(s):**

(c) **Decreasing Interval(s):**

(d) **Relative Maximum Occurs:**

(e) **Relative Minimum Occurs:**

(f) **Concave Up Interval(s):**

(g) **Concave Down Interval(s):**

(h) **Inflection Point(s):**

4. Given the graph of $f'(x)$ below, answer the following question for $f(x)$.

$f'(x)$

(a) **Critical Number(s):**

(b) **Increasing Interval(s):**

(c) **Decreasing Interval(s):**

(d) **Relative Maximum Occurs:**

(e) **Relative Minimum Occurs:**

(f) **Concave Up Interval(s):**

(g) **Concave Down Interval(s):**

(h) **Inflection Point(s):**

The End.

Summary: When given the graph of f',

1. Critical Point/Number:	Where the graph touches/crosses the x-axis
2. Increasing:	Where the graph is above the x-axis
3. Decreasing:	Where the graph is below the x-axis
4. Relative Max: **5. Relative Min:**	Create # line from (2) and (3), and then use First Derivative Test
6. Concave Up:	Where the slope of f' is positive
7. Concave Down:	Where the slope of f' is negative
8. Inflection Point:	Create a # line with (6) and (7) and check for changes in sign