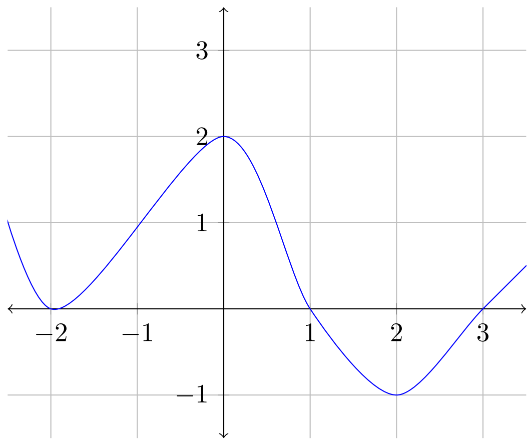
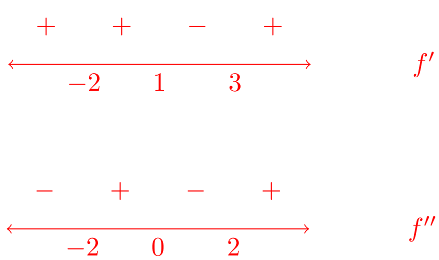
Please show **all** your work! Answers without supporting work will not be given credit. Write answers in spaces provided.

Name:______________________________

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





(a) **[1 pt] Critical Number(s):**

$x = -2, 1, 3$

(b) **[1 pt] Increasing Interval(s):**

$(-\infty, 1) \cup (3, \infty)$

(c) **[1 pt] Decreasing Interval(s):**

$(1, 3)$

(d) **[1 pt] Relative Maximum Occurs at**

$x = 1$

(e) **[1 pt] Relative Minimum Occurs at**

$x = 3$

(f) **[1 pt] Concave Up Interval(s):**

$(-2, 0) \cup (2, \infty)$

(g) **[1 pt] Concave Down Interval(s):**

$(-\infty, -2) \cup (0, 2)$

(h) **[1 pt] Inflection Point(s) Occurs at**

$x = -2, 0, 2$

2. **[4 pts]** Find the x-coordinate for the absolute max. of $f(x) = -x^3 + 12x = 0$ over the interval $[-3, 5]$.

Solution:

First find when $f'(x) = 0$.

$$f'(x) = -3x^2 + 12 = 0 \qquad \textbf{[1 pt]}$$
$$-3(x^2 - 4) = 0$$
$$x = \pm 2 \qquad \textbf{[1 pt]}$$

Note that both $x = -2$ and $x = 2$ are in our interval $[-3, 5]$.

So with those values determine the absolute maximum with the following table: **[1 pt]**

x	$f(x)$	Conclusion
-3	-9	
-2	-16	
2	16	Absolute max
5	-65	

Hence we have an absolute maximum at $x = 5$. **[1 pt]**