## 5.4 The First Derivative Test

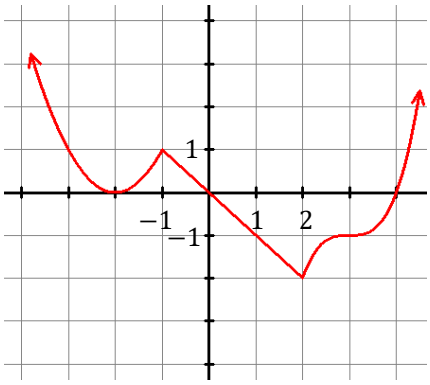
Calculus

Name: _____

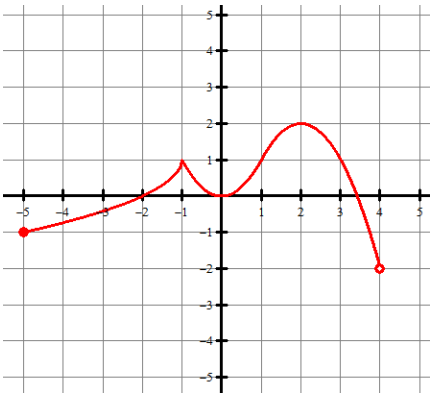
**CA #2**

**For each problem, the graph of $f'$, the derivative of $f$, is shown. Find all relative max/min of $f$ and justify.**

1.




2.



**For each problem, the derivative of a function $g$ is given. Find all relative max/min of $g$ and justify.**

3. $g'(x) = (x-2)(x+5)$

4. $g'(x) = 3x^2 - 12$

**Use the First Derivative Test to locate the $x$-value of all extrema. Classify if it is a relative max or min, and justify your answer.**

5. $h(x) = x^3 - \frac{3}{2}x^2$

6. $f(x) = xe^x$

7. What is the relative maximum value of $f(x) = \frac{1}{x} + x$?

Answers to 5.4 CA #2

| | | |
|---|---|---|
| 1. Min at $x = 4$ because $f'$ changes sign from negative to positive.<br><br>Max at $x = 0$ because $f'$ changes sign from positive to negative. | 2. Min at $x = -2$ because $f'$ changes sign from negative to positive.<br><br>Max at $x \approx 3.4$ because $f'$ changes sign from positive to negative. | 3. Min at $x = 2$ because $f'$ changes sign from negative to positive.<br><br>Max at $x = -5$ because $f'$ changes sign from positive to negative. |

| | | | |
|---|---|---|---|
| 3. Min at $x = 2$ because $f'$ changes sign from negative to positive.<br><br>Max at $x = -2$ because $f'$ changes sign from positive to negative. | 5. Min at $x = 1$ because $f'$ changes sign from negative to positive.<br><br>Max at $x = 0$ because $f'$ changes sign from positive to negative. | 6. Min at $x = -1$ because $f'$ changes sign from negative to positive.<br><br>No Max | 7. Min value of 2 at $x = 1$<br>Max value of $-2$ at $x = -1$ |