5.4 The First Derivative Test

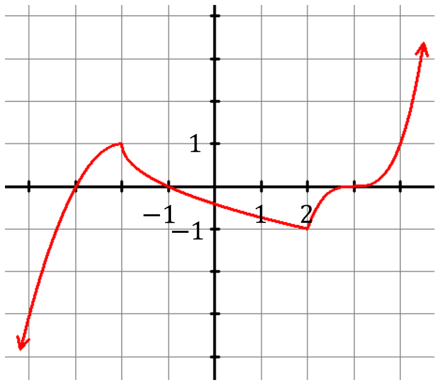
Calculus

Name: ______________________________

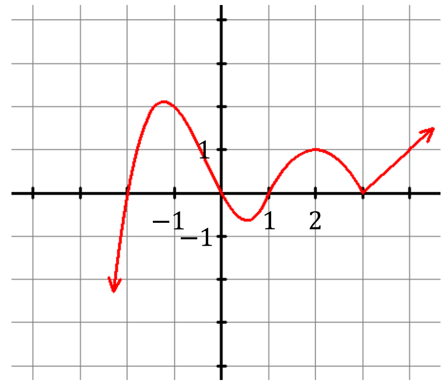
CA #1

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. $g'(x) = \frac{x^2-5}{x}$ for all $x \neq 0$.

4. $g'(x) = (3-x)x^{-2}$ for $x > 0$

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. $h(x) = -2x^3 + 6x^2 - 3$

6. $f(x) = xe^{\frac{1}{x}}$

7. What is the relative minimum value of $f(x) = x^3 - 3x^2 + 1$?

Answers to 5.4 CA #1

1. Min at $x = -3$ and $x = 3$ because f' changes sign from negative to positive. Max at $x = -1$ because f' changes sign from positive to negative.	2. Min at $x = -2$ and $x = 1$ because f' changes sign from negative to positive. Max at $x = 0$ because f' changes sign from positive to negative.	3. Min at $x = -\sqrt{5}$ and $x = \sqrt{5}$ because f' changes sign from negative to positive. No Max.

4. Max at $x = 3$ because f' changes sign from positive to negative.	5. Min at $x = 0$ because f' changes sign from negative to positive. Max at $x = 2$ because f' changes sign from positive to negative.	6. Min at $x = 1$ because f' changes sign from negative to positive. No max at $x = 0$ because it is not a critical point. $x = 0$ is not in the domain of f.	7. Min value of -3 at $x = 2$