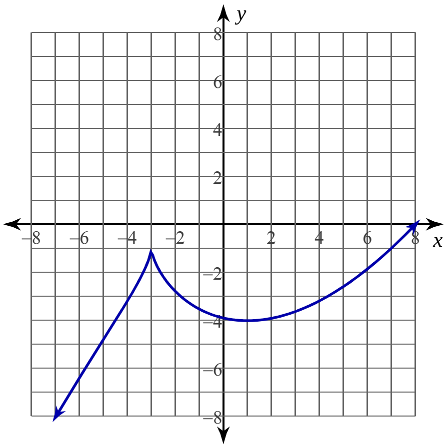
Name________________________________

Extrema, Increase and Decrease

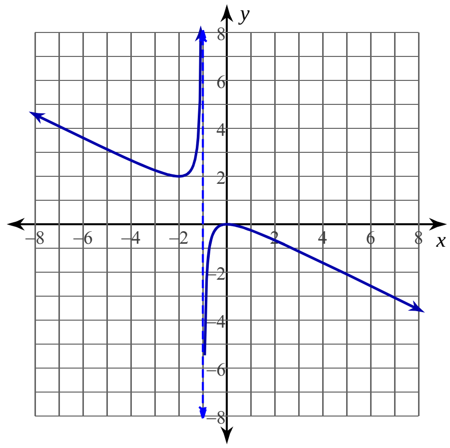
Date________________ Period____

Approximate the relative extrema of each function.

1)



2)



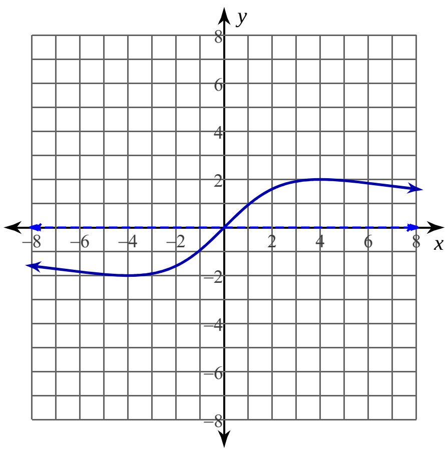
Use a graphing calculator to approximate the relative extrema of each function.

3) $y = -x^3 + 4x^2 - 4$

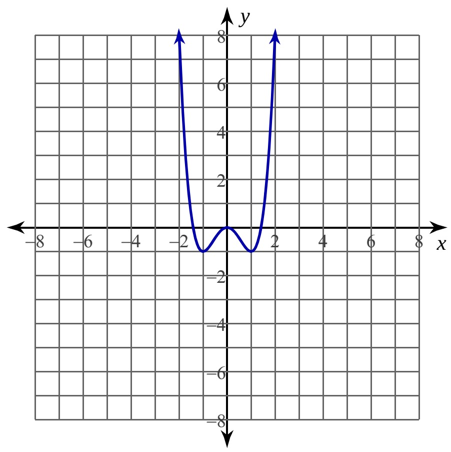
4) $y = \frac{x^2}{4x + 4}$

Approximate the intervals where each function is increasing and decreasing.

5)



6)



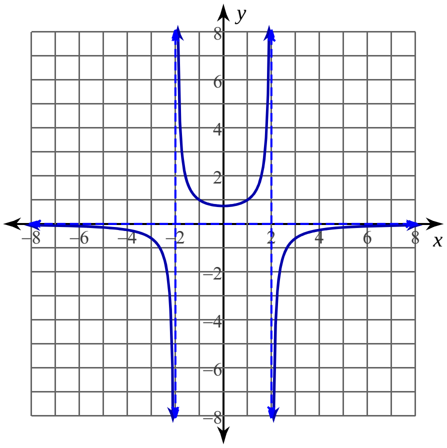
Use a graphing calculator to approximate the intervals where each function is increasing and decreasing.

7) $y = x^4 - 2x^2 - 3$

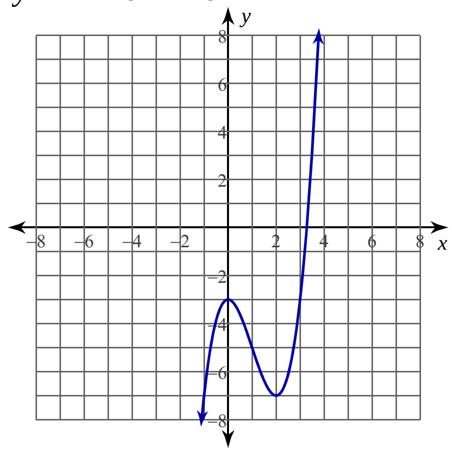
8) $y = -\frac{2}{x^2 - 1}$

Approximate the relative and absolute extrema of each function. Then approximate the intervals where each function is increasing and decreasing.

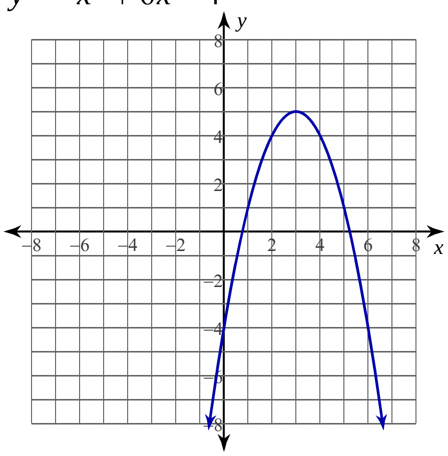
9) $y = -\dfrac{3}{x^2 - 4}$



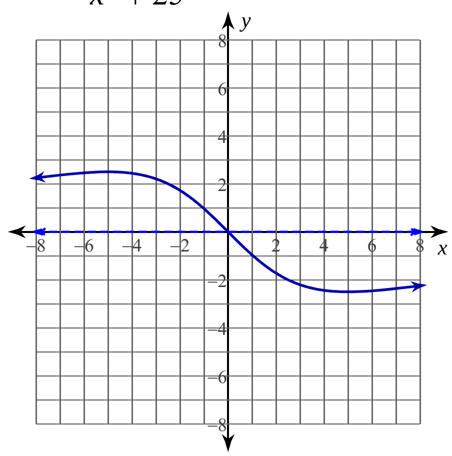
10) $y = x^3 - 3x^2 - 3$



11) $y = -x^2 + 6x - 4$



12) $y = -\dfrac{25x}{x^2 + 25}$



Critical thinking questions:

13) Write a function that has the following relative maximums: $(1, 1)$, $(2, 2)$, $(3, 3)$.

14) Is it possible for a continuous function to have only the following extrema?
Relative max: $(1, 1)$, $(3, 3)$
Relative min: $(2, 2)$
Explain why or why not.

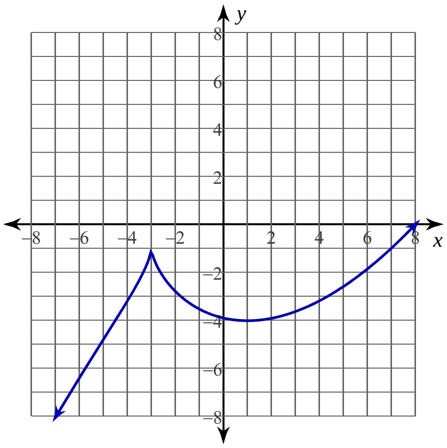
Candle Center - Infinite Precalculus   Name________________________________

Extrema, Increase and Decrease

Date________________ Period____

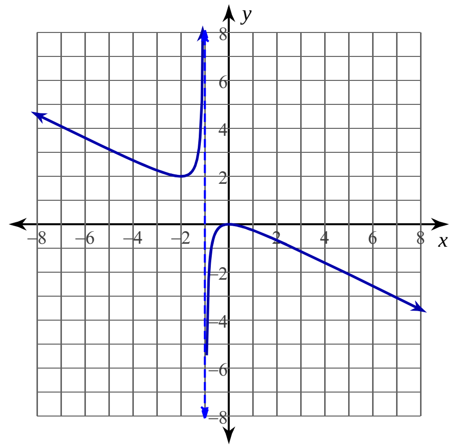
Approximate the relative extrema of each function.

1)



Relative minimum: $(1, -4)$
Relative maximum: $(-3, -1)$

2)



Relative minimum: $(-2, 2)$
Relative maximum: $(0, 0)$

Use a graphing calculator to approximate the relative extrema of each function.

3) $y = -x^3 + 4x^2 - 4$

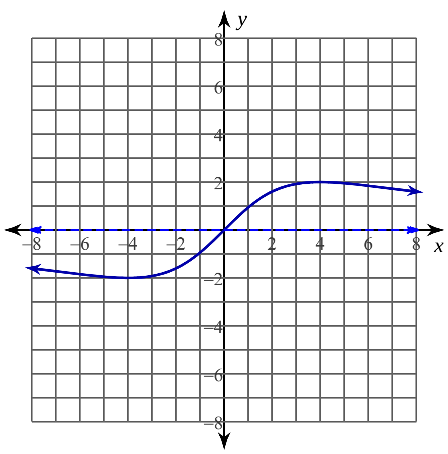
Relative minimum: $(0, -4)$
Relative maximum: $(2.7, 5.5)$

4) $y = \dfrac{x^2}{4x + 4}$

Relative minimum: $(0, 0)$
Relative maximum: $(-2, -1)$

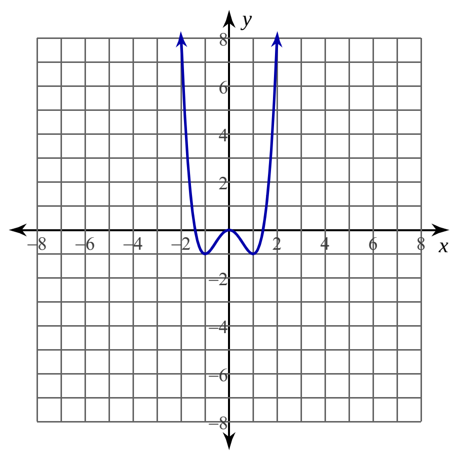
Approximate the intervals where each function is increasing and decreasing.

5)



Increasing: $(-4, 4)$ Decreasing: $(-\infty, -4)$, $(4, \infty)$

6)



Increasing: $(-1, 0)$, $(1, \infty)$ Decreasing: $(-\infty, -1)$, $(0, 1)$

Use a graphing calculator to approximate the intervals where each function is increasing and decreasing.

7) $y = x^4 - 2x^2 - 3$

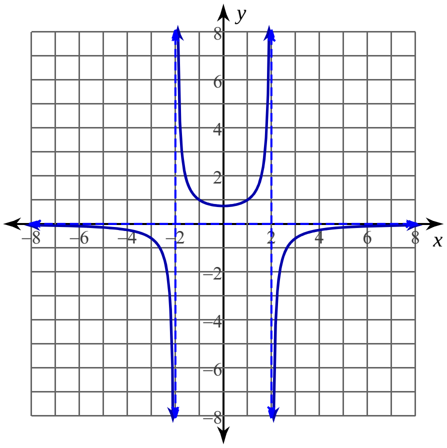
Increasing: $(-1, 0)$, $(1, \infty)$ Decreasing: $(-\infty, -1)$, $(0, 1)$

8) $y = -\dfrac{2}{x^2 - 1}$

Increasing: $(0, 1)$, $(1, \infty)$ Decreasing: $(-\infty, -1)$, $(-1, 0)$

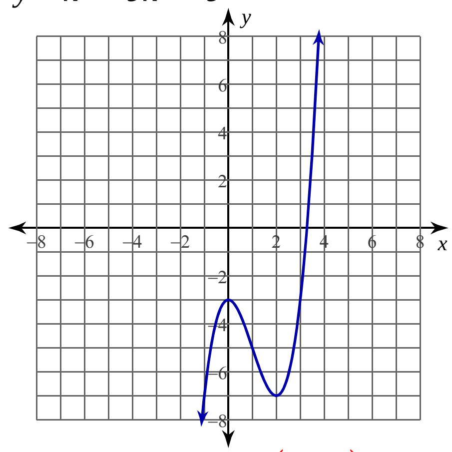
Approximate the relative and absolute extrema of each function. Then approximate the intervals where each function is increasing and decreasing.

9) $y = -\dfrac{3}{x^2 - 4}$



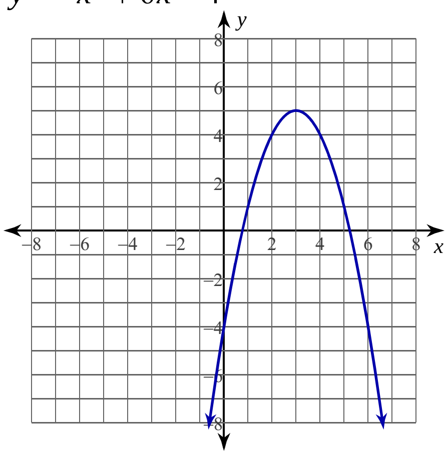
Relative minimum: $(0, 0.8)$
No absolute or relative maxima.
Increasing: $(0, 2)$, $(2, \infty)$ Decreasing: $(-\infty, -2)$, $(-2, 0)$

10) $y = x^3 - 3x^2 - 3$



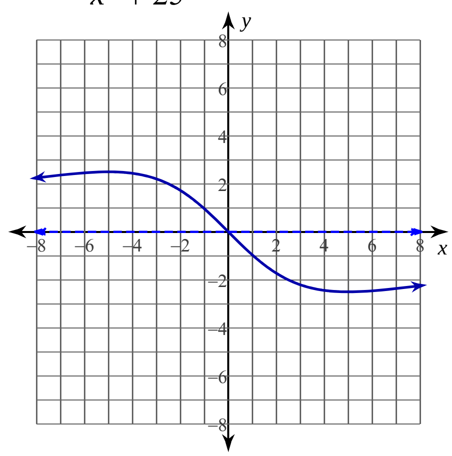
Relative minimum: $(2, -7)$
Relative maximum: $(0, -3)$
Increasing: $(-\infty, 0)$, $(2, \infty)$ Decreasing: $(0, 2)$

11) $y = -x^2 + 6x - 4$



No absolute or relative minima.
Absolute maximum: $(3, 5)$
Increasing: $(-\infty, 3)$ Decreasing: $(3, \infty)$

12) $y = -\dfrac{25x}{x^2 + 25}$



Absolute minimum: $(5, -2.5)$
Absolute maximum: $(-5, 2.5)$
Increasing: $(-\infty, -5)$, $(5, \infty)$ Decreasing: $(-5, 5)$

Critical thinking questions:

13) Write a function that has the following relative maximums: $(1, 1)$, $(2, 2)$, $(3, 3)$.

$y = -10(x - 1)^2 \cdot (x - 2)^2 \cdot (x - 3)^2 + x$

14) Is it possible for a continuous function to have only the following extrema?
Relative max: $(1, 1)$, $(3, 3)$
Relative min: $(2, 2)$
Explain why or why not.

No, the function can't be decreasing to the right of $x = 1$ and decreasing just left of $x = 2$ yet jump from $y = 1$ to $y = 2$ with no periods of increase without being discontinuous.