

1. Given the following function and its derivatives

$$f(x) = \frac{2(x^2 - 9)}{x^2 - 4} \quad f'(x) = \frac{20x}{(x^2 - 4)^2} \quad f''(x) = \frac{-20(3x^2 + 4)}{(x^2 - 4)^3}$$

Fill in the following information about the function and its graph. Show all work and write “none”, if applicable.

domain: _____

x-intercept(s): _____

y-intercept: _____

vertical
asymptote(s): _____

horizontal
asymptote(s): _____

slant asymptote: _____

critical numbers: _____

intervals where
increasing: _____

intervals where
decreasing: _____

coordinates of
local max/min(s): _____

intervals where
concave up: _____

intervals where
concave down: _____

Inflection Point(s): _____

Sketch the graph of the function on the set of axes provided separately.

2. Given the following function and its derivatives

$$f(x) = x\sqrt{x^2 - 4} \qquad f'(x) = \frac{2(x^2 - 2)}{\sqrt{x^2 - 4}} \qquad f''(x) = \frac{2x(x^2 - 6)}{(x^2 - 4)^{3/2}}$$

Fill in the following information about the function and its graph. Show all work and write “none”, if applicable.

domain: _____

x-intercept(s): _____

y-intercept: _____

vertical
asymptote(s): _____

horizontal
asymptote(s): _____

slant asymptote: _____

critical numbers: _____

intervals where
increasing: _____

intervals where
decreasing: _____

coordinates of
local max/min(s): _____

intervals where
concave up: _____

intervals where
concave down: _____

Inflection Point(s): _____

Sketch the graph of the function on the set of axes provided separately.

3. Given the following function and its derivatives

$$f(x) = \frac{x^2 - 3x + 9}{3 - x} \quad f'(x) = \frac{-x(x - 6)}{(x - 3)^2} \quad f''(x) = \frac{-18}{(x - 3)^3}$$

Fill in the following information about the function and its graph. Show all work and write “none”, if applicable.

domain: _____

x-intercept(s): _____

y-intercept: _____

vertical
asymptote(s): _____

horizontal
asymptote(s): _____

slant asymptote: _____

critical numbers: _____

intervals where
increasing: _____

intervals where
decreasing: _____

coordinates of
local max/min(s): _____

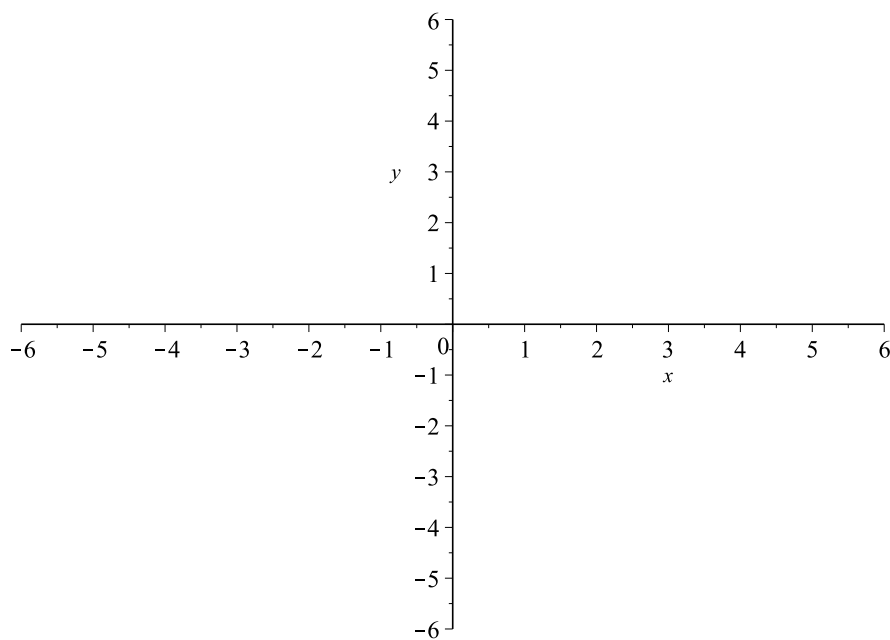
intervals where
concave up: _____

intervals where
concave down: _____

Inflection Point(s): _____

Sketch the graph of the function on the set of axes provided separately.

Sketch the graph of the function $f(x) = \frac{2(x^2 - 9)}{x^2 - 4}$ from Example 1. Label any maximum and minimum values and inflection points.



Sketch the graph of the function $f(x) = x\sqrt{x^2 - 4}$ from Example 2. Label any maximum and minimum values and inflection points.

