Math 31 **Name ____________**

Date ____________

CURVE SKETCHING HW #2

1. Given, $f(x) = \dfrac{x^2 - 4x - 12}{x^2 - 9}$

   Find the vertical and horizontal asymptotes of the curve.

[3]

2. Identify the intervals of increase and decrease for $y = f(x)$ given $f'(x) = \dfrac{x-1}{(x+2)^2}$.

[3]

3. Identify the intervals of concave up and concave down for $y = f(x)$ given $f''(x) = \dfrac{x-10}{\sqrt{x+3}}$.

[3]

4. For the curve $y = 2x^3 - 9x^2 + 12x - 10$, find the local maximum and/or minimum values. Justify.

[4]

5. For the curve $y = 2x^3 + 12x^2 + 18x + 5$

a) Find the intervals of increase and decrease.

[5]

b) Find the intervals of concavity.

c) Find any inflection points.

6. Find the following limits:

a) $\lim_{x\to\infty} x^3+3x^2-4$

b) $\lim_{x\to-\infty} x^3+3x^2-4$

[4]

c) $\lim_{x\to\infty}(x-3)(x+2)^2(2-x)$

d) $\lim_{x\to-\infty}(x-3)(x+2)^2(2-x)$

7. Find the equations for the vertical and horizontal asymptotes:

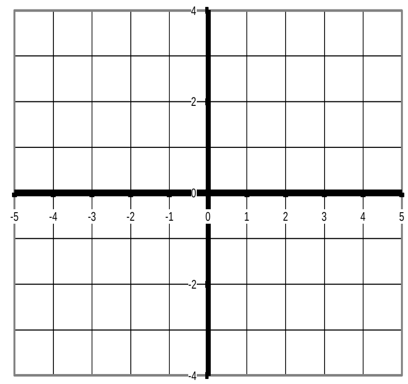
a) $y=\dfrac{4x-3}{2x+4}$

[4]

b) $y=\dfrac{x}{x^2+x-6}$

8. Given the following properties, sketch the curve for $f(x)$.

[2] The domain is $\{x \in R\}$. There are no x-intercepts and $f(0) = -4$. There are no vertical asymptotes. The horizontal asymptote is the line $y = -\frac{1}{2}$. The interval of decrease is $(-\infty, 0)$ and the interval of increase is $(0, \infty)$. $f(x)$ is concave downward on $(-\infty, -1) \cup (1, \infty)$ and is concave upward on $(-1, 1)$. The points of inflection are at $(\pm 1, -3)$.



7. Sketch the function given:

[2] The domain is $\{x \neq \pm 2\}$. The intercepts are both at 0 and $f(0)$ is a local minimum. The vertical asymptotes are $x = 2$ and $x = -2$. The horizontal asymptote is the line $y = -4$. The interval of increase is $(0,2) \cup (2, \infty)$. The interval of decrease is $(-\infty, -2) \cup (-2, 0)$. $f(x)$ is concave upward on $(-2, 2)$. $f(x)$ is concave downward on $(-\infty, -2) \cup (2, \infty)$. There are no points of inflection.