Directions: Please answer the following questions and make sure your answer are legible. You must show your work to receive credit for your answers. You may not use a calculator (or any other technology) on this quiz. Good Luck.

1. (7 points) For \( f(x) = \frac{x^3 + 1}{x^2 - 1} \) (4.1 #6)
   
   (a) Find the domain of \( f \).

   (b) Find the vertical and horizontal asymptotes of \( y = f(x) \) (or indicate there are none).

2. (6 points) Graph the rational function \( h(x) = \frac{-2x + 1}{x} \) by applying transformations to the graph of \( y = \frac{1}{x} \). (Hint: divide) (4.2 #19)

There is another question on the back.
3. (12 points) (4.2 #10)

Graph the rational function \( f(x) = \frac{3x^2 - 5x - 2}{x^2 - 9} \). Draw asymptotes as dashed lines.

Make sure to clearly indicate all the information you should be finding using the six step process.

\[
\frac{f(x)}{\text{over}} \quad \text{this is as simple as it gets}
\]

**Domain:** \((-\infty, -3) \cup (-3, 3) \cup (3, \infty)\)

\(\text{VA: } x = 3, \quad x = -3\)

**Holes:** None

**HA:** \( y = \frac{3}{2} \)

\[
\frac{\text{deg } 2}{\text{deg } 2}
\]

\[
\begin{array}{c|c}
\text{x-inter} & \text{y-inter} \\
\hline
(-\frac{1}{3}, 0) & (2, 0) \\
(0, \frac{(1)(-2)}{(3)(-1)}) & (0, \frac{2}{3})
\end{array}
\]

\[
\frac{f(4)}{\text{over}}
\]

\[
\frac{f(-3)}{\text{over}}
\]

\[
\frac{f(0)}{\text{over}}
\]

\[
\frac{f(100)}{\text{over}} \quad \text{without a calculator it's hard to know what you approach y = ? from above or below}
\]

\[
\text{you need to know f(2) f(100) is 3.1 or 2.9}
\]