Example 2: Consider \( f(x) = x^2 - 4 \)

a) What is the reciprocal function?
\[
\frac{1}{x^2 - 4}
\]

b) State the non-permissible values of \( x \) and the equation(s) of the vertical asymptote(s) of the reciprocal function.
\[
\begin{align*}
x &= 2 \\
x &= -2
\end{align*}
\]

c) What are the \( x \)-intercepts and \( y \)-intercepts of the reciprocal function?
\[
\begin{align*}
\text{\( x \)-int:} & \quad (-2, 0)(2, 0) \\
\text{\( y \)-int:} & \quad -\frac{1}{4} \\
\text{original} & \quad \text{reciprocal}
\end{align*}
\]

d) Graph both functions with a graphing calculator. Describe a strategy that could be used to sketch the graph of a reciprocal function.
TRY ME!!! Consider \( f(x) = x^2 + x - 6 \)

a) What is the reciprocal function?

\[
f(x) = \frac{1}{x^2 + x - 6}
\]

b) State the non-permissible values of \( x \) and the equation(s) of the vertical asymptote(s) of the reciprocal function.

\[
0 = x^2 + x - 6
\]

\[
0 = (x+3)(x-2)
\]

Non-permissible values: \( x \neq -3, 2 \)

Vertical asymptotes: \( x = -3, x = 2 \)
c) What are the x-intercepts and y-intercepts of the reciprocal function?

Reciprocal functions don’t have x-intercepts. Reciprocal = \(-\frac{1}{6}\) original = \(-6\)

Original = \(-6\)

Reciprocal = \(-\frac{1}{6}\)

d) Graph both functions with a graphing calculator. Describe a strategy that could be used to sketch the graph of a reciprocal function.

e) Using the table of values, sketch the function

Asymptotes
\(x = -3\)
\(x = 2\)

Invariant
\(y = 1\)
\(y = -1\)

Assignment: Page 404 #8