Rational Expressions
(Fractions)

I. Simplify Fractions

\[
\frac{20}{25} = \frac{4 \cdot 5}{5 \cdot 5} = \frac{4}{5}
\]

\[
\frac{15x^2}{35x^5} = \frac{3 \cdot 5 \cdot x \cdot x}{7 \cdot 5 \cdot x \cdot x \cdot x \cdot x} = \frac{3}{7x^3}
\]

\[
\frac{9x^2 + 9x}{2x + 2} = \frac{9x(x + 1)}{2(x + 1)} = \frac{9x}{2}
\]

\[
\frac{x^2 + 8x - 20}{x^2 + 11x + 10} = \frac{(x + 10)(x - 2)}{(x + 10)(x + 1)} = \frac{x - 2}{x + 1}
\]

\[
\frac{x^2 + 2x - 15}{x^2 - 25} = \frac{(x + 5)(x - 3)}{(x + 5)(x - 5)} = \frac{x - 3}{x - 5}
\]

\[
\frac{x^2 - 16}{4 - x} = \frac{(x + 4)(x - 4)}{(4 - x)} = -x + 4
\]

Domain - Acceptable values for \( x \):

1. Take the denominator and set it equal to 0.
2. Solve for \( x \), whatever value you find is what \( x \) CANNOT be.
3. Write it in set notation.

\[\{ x | x \neq 4, 3 \}\]

\[
\frac{3x}{2x - 8} = \frac{x + 3}{7x + 8}
\]

\[
7x + 8 = 0
\]

\[
7x = -8
\]

\[
x = \frac{-8}{7}
\]

\[\{ x | x \neq \frac{-8}{7} \}\]