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MATH 1314 + MATH 0270
College Algebra with Foundations
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Rational Expressions (Fractions)

I. simplify Fractions

$\frac{20}{25} = \frac{4 \cdot 5}{5 \cdot 5} = \frac{4}{5}$ $\quad \frac{15x^2}{35x^5} = \frac{3 \cdot 5 \cdot x \cdot x}{7 \cdot 5 \cdot x \cdot x \cdot x \cdot x \cdot x} = \frac{3}{7x^3}$

$\frac{9x^2+9x}{2x+2} = \frac{9x(x+1)}{2(x+1)} = \frac{9x}{2}$ $\quad \frac{x^2+8x-20}{x^2+11x+10} = \frac{(x+10)(x-2)}{(x+10)(x+1)} = \frac{(x-2)}{(x+1)}$

$\frac{x^2+2x-15}{(x^2-25)} = \frac{(x+5)(x-3)}{(x+5)(x-5)} = \frac{(x-3)}{(x-5)}$ $\quad \frac{x^2-16}{4-x} = \frac{(x+4)(x-4)}{(4-x)} = -(x+4)$

These are opposites so you can cancel as long as you leave a factor of (-1).

Domain - acceptable values for x.

$\frac{3x}{2x-8}$

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

$2x-8=0$

$2x-8 \neq 0$
$+8 \quad +8$
$2x \neq 8$
$x \neq 4$

$\{x \mid x \in R, x \neq 4\}$

This method if for fractions.

ex $\frac{x+3}{7x+8}$

$7x+8=0$

$7x=-8$

$x=\frac{-8}{7}$ $\quad \{x \mid x \in R, x \neq \frac{-8}{7}\}$