Rational Expressions

A Rational Expression is a QUOTIENT of two POLYNOMIALS.

Examples of Rational Expressions			Non Examples of Rational Expressions		
$\frac{x^2-4}{x+2}$	$\frac{10}{x^2-6}$	$\frac{x^2-5x+6}{x^2+3x+2}$	$\frac{x+2}{3}$	$\frac{2}{5}$	x^3-1

Remember when...Simplify each expressions

a) $\frac{3x^7}{2x^4}$

$\frac{3}{2}\cdot\frac{x^7}{x^4}=\frac{3}{2}\cdot\frac{x^3}{1}$

$\Rightarrow \frac{3x^3}{2}$

b) $\frac{16x^{11}}{8x^2}$

$\frac{16}{8}\cdot\frac{x^{11}}{x^2}=\frac{2}{1}\cdot\frac{x^9}{1}$

$\Rightarrow 2x^9$

c) $\frac{12x}{16x^5}$

$\frac{12}{16}\cdot\frac{x}{x^5}=\frac{3}{4}\cdot\frac{1}{x^4}$

$\Rightarrow \frac{3}{4x^4}$

Now let's really have some fun ☺
Factor each expression completely, then cancel out common factors that appear in numerator AND denominator

d) $\frac{x^2-5x+6}{x^2+3x+2}$

$\frac{(x-2)(x-3)}{(x+1)(x+2)}$

no common factors

e) $\frac{x-5}{x^2-25}$

$\frac{x-5}{(x-5)(x+5)}$

$\Rightarrow \frac{1}{x+5}$

f) $\frac{2x^2-32}{x^2-x-12}$

$\frac{2(x-4)(x+4)}{(x-4)(x+3)}$

$\Rightarrow \frac{2(x+4)}{x+3}$

Identify ANY x-values for which the original expression is undefined. (set denominator equal to zero + solve)

x^2+3x+2
$(x+1)(x+2)=0$
$x\neq -1 \; + \; x\neq -2$

x^2-25
$(x-5)(x+5)=0$
$x\neq 5 \; + \; x\neq -5$

x^2-x-12
$(x+3)(x-4)=0$
$x\neq -3 \; + \; x\neq 4$

More practice for you!

1) $\frac{6x-18}{x^2-6x+9}$

$\frac{6(x-3)}{(x-3)(x-3)}$

$\boxed{\frac{6x}{x-3}}$

$x \neq 3$

2) $\frac{x^2-49}{x^2-4x-21}$

$\frac{(x-7)(x+7)}{(x-7)(x+3)}$

$\boxed{\frac{x+7}{x+3}}$

$x \neq 7, -3$

3) $\frac{6x^2+x-1}{4x^2-1}$

$\frac{(2x+1)(3x-1)}{(2x-1)(2x+1)}$

$\boxed{\frac{3x-1}{2x-1}}$

$x \neq \pm \frac{1}{2}$

4) $\frac{4x^2-36}{3x^2-27}$

$\frac{4(x-3)(x+3)}{3(x+3)(x-3)}$

$\boxed{\frac{4}{3}}$

$x \neq \pm 3$

5) $\frac{54xy^6}{48x^3y}$

$\frac{54}{48} \cdot \frac{x}{x^3} \cdot \frac{y^6}{y}$

$\frac{9}{8} \cdot \frac{1}{x^2} \cdot \frac{y^5}{1}$

$\boxed{\frac{9y^5}{8x^2}}$

$x \neq 0$

$y \neq 0$

6) $\frac{32x^{-2}yz^6}{48xy^{-4}z^4}$

$\frac{32}{48} \cdot \frac{x^{-2}}{x} \cdot \frac{y}{y^{-4}} \cdot \frac{z^6}{z^4}$

$\frac{2}{3} \cdot \frac{1}{x^3} \cdot \frac{y^5}{1} \cdot \frac{z^2}{1}$

$\boxed{\frac{2y^5z^2}{3x^3}}$

$x \neq 0$

$y \neq 0$

$z \neq 0$

GLUE HERE