Simplifying, mult., & divide, rational expressions

$$\frac{ac}{bc} = \frac{a}{b} \qquad \frac{a+c}{b+c} \neq \frac{a}{b}$$

In order to reduce, everything has to be in factored form.
(denominator can't equal 0, will look at domain restrictions later)

$$\frac{x+1}{x+2} \qquad \frac{3x}{4x} \qquad \frac{2x+4}{x+2}$$

**Recognize factors that reduce to 1 or -1

$$\frac{-7x}{7x} \qquad \frac{(x+2)}{-(x+2)} \qquad \frac{x+4}{-x-4} \qquad \frac{x-5}{5-x}$$

Make a decision as to whether the expressions equal 1 , -1 or neither.

$\frac{x-1}{1-x}$	$\frac{x+2}{2+x}$	$\frac{x-3}{x+3}$	$\frac{x^2-1}{1-x^2}$
$\frac{(x+3)^2}{x^2+6x+9}$	$\frac{3(x+4)}{(x+4)(3)}$	$\frac{v^2-1}{v^2+1}$	$\frac{-x-3}{x+3}$
$\frac{-x+3}{3-x}$	$\frac{y^2+1}{1+y^2}$	$\frac{x^2+2x-1}{x^2+2x+1}$	$\frac{x^2-2x-3}{3+2x-x^2}$
$\frac{a-b}{-a+b}$	$\frac{x^2+3x+1}{3x+1+x^2}$	$\frac{5-x}{5-x}$	$\frac{(x+3)^2}{x^2+9}$

Circle the expressions that are the same and place an x over the "oddball" expression in each row.

1.	~~$\frac{-4}{-x}$~~	$\frac{-4}{x}$	$\frac{4}{-x}$	$-\frac{4}{x}$
2.	$-\frac{x+3}{x-4}$	$\frac{-x-3}{x-4}$	$\frac{-x-3}{-x+4}$	$\frac{x+3}{4-x}$
3.	$\frac{x-5}{5-x}$	$\frac{x-5}{x-5}$	$-\frac{x-5}{x-5}$	$\frac{x-5}{-x+5}$
4.	$-\frac{-x-4}{-x-4}$	$\frac{x+4}{x+4}$	$\frac{x+4}{4+x}$	$-\frac{-x-4}{x+4}$
5.	$-\frac{x+1}{1-x}$	$\frac{1+x}{x-1}$	$\frac{x+1}{x-1}$	$\frac{1+x}{1-x}$
6.	$\frac{x-4}{(x+1)(x+3)}$	$\frac{x-4}{x^2+4x+3}$	$\frac{4-x}{x^2+4x+3}$	$-\frac{4-x}{x^2+4x+3}$

Simplify:

Domain: $x \neq$

$y \neq$

1. $\dfrac{8x^3y}{2xy^2} \cdot \dfrac{7x^4y^3}{4y}$

2. $\dfrac{x^2 + 5x + 6}{x^2 + 3x}$

Domain: $x \neq$

3. $\dfrac{x^2 + 5x}{x^2 + x}$

Domain: $x \neq$

4. $\dfrac{x^2 - 2x - 15}{9 - x^2}$

Domain: $x \neq$

5. $\dfrac{4 - x}{x^2 - 16}$ Domain: $x \neq$

Multiply Domain: $x \neq$

6. $\dfrac{3x - 3x^2}{x^2 + 4x - 5} \cdot \dfrac{x^2 + x - 20}{3x}$

7. Domain: $x \neq$

$$\frac{x^2 + 4x + 3}{x^2 + 5x + 6} \cdot \frac{x^2 - 3x - 10}{x^2 + x}$$

8. Divide Domain: $x \neq$

$$\frac{7x}{2x - 10} \div \frac{x^2 - 6x}{x^2 - 11x + 30}$$

9.

Domain: $x \neq$

$$\frac{9x^2}{3 - 6x} \div \frac{3x^2 - 12x}{2x^2 - x}$$