Last day's work: Factoring Worksheet #(3,4)def, 6acd, 9, 10, 11gijo, 12bg [13]

6a) $(x+y)^2+9(x+y)-10$

let $w=x+y$

$w^2+9w-10$

$=(w+10)(w-1)$

$=(x+y+10)(x+y-1)$

$x^2-13x+36$

12g) $x^4-13x^2+36$

$=(x^2-9)(x^2-4)$

$=(x-3)(x+3)(x-2)(x+2)$

11o) $81a^2-(3a+b)^2$

$w=3a+b$

$81a^2-w^2$

$=(9a-w)(9a+w)$

$=(9a-(3a+b))(9a+(3a+b))$

$=(9a-3a-b)(9a+3a+b)$

$=(6a-b)(12a+b)$

# Today's Learning Goal(s):

By the end of the class, I will be able to:

a) simplify a rational expression .
b) state the restrictions for a rational expression .

## 2.4 Simplifying Rational Functions

Date: Feb. 10, 2017
(Every lesson)

Ex.1 Simplify. State any restrictions on the variables.

a) $\frac{20}{25}$

$= \frac{5 \times 4}{5 \times 5}$

$= \frac{4}{5}$

b) $\frac{15x^2y^1}{20x^3y^1}$

$= \frac{3}{4}x^{2-3}y^{1-1}$

$= \frac{3}{4}x^{-1}y^0$

$\rightarrow \frac{3}{4}\left(\frac{1}{x}\right)^1$

$= \frac{3}{4x}$

Restriction: $x \neq 0$, $y \neq 0$

Note: Placing "restrictions" on the variables prevents the denominator from becoming zero, because division by zero is ***undefined***.

Simplify. State any restrictions on the variable.

c) $\frac{20x^2-25x}{15x}$

$=\frac{5x(4x-5)}{3\cancel{15x}}$

$=\frac{4x-5}{3}$

R: $x\neq 0$

d) $\frac{6x^2}{2x^2-4x}$

$=\frac{3\cancel{6x}}{\cancel{2x}(x-2)}$

$=3(x-2)$

$2x(x-2)$

R: $2x\neq 0$ $x\neq 0$

$x-2\neq 0$ $x\neq 2$

e) $\frac{x^2+3x-10}{4-2x}$

$=\frac{(x+5)(x-2)}{-2(-2+x)}$

$=\frac{x+5}{-2}$

$-2+x\neq 0$

$x\neq 2$

R: $x\neq 2$

f) $\frac{6t^2+7t-5}{4t^2-1}$

$=\frac{(2t-1)(3t+5)}{(2t-1)(2t+1)}$

$=\frac{3t+5}{2t+1}$

R: $2t-1\neq 0$; $2t+1\neq 0$

$2t\neq 1$ $2t\neq -1$

$t\neq \frac{1}{2}$ $t\neq -\frac{1}{2}$

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

g) $\frac{6x^2-xy-y^2}{2x^2-3xy+y^2}$

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

$=\frac{3x+y}{x-y}$

R: $x-y\neq 0$ $2x-y\neq 0$

$\therefore x\neq y$ $2x\neq y$

or $x\neq \frac{1}{2}y$

Ex.2 Evaluate $\frac{x^2+3x-10}{4-2x}$ for:

a) $x=3$

$$\frac{(3)^2+3(3)-10}{4-2(3)}$$

$$=\frac{9+9-10}{4-6}$$

$$=\frac{8}{-2}$$

$$=-4$$

$$\frac{x+5}{-2}$$

$$=\frac{(3)+5}{-2}$$

$$=\frac{8}{-2}$$

$$=-4$$

b) $x=2$

$$\frac{(2)^2+3(2)-10}{4-2(2)}$$

$$=\frac{4+6-10}{4-4}$$

$$=\frac{10-10}{0}$$

undefined

$$\frac{x+5}{-2}$$

$$=\frac{(2)+5}{-2}$$

$$=\frac{7}{-2}$$

**"*Restrictions*" on the variable MUST be determined, even if not asked for directly.**

**Are there any Homework Questions you would like to see on the board?**

Last day's work: Factoring Worksheet #(3,4)def, 6acd, 9, 10, 11gijo, 12bg [13]

Today's Homework Practice includes:
pp. 112-114 #(1 – 7)ace, 10
[16, 17]

*If finished, you may wish to work ahead on tomorrow's work:*
pp. 122-123 #(4 – 7)ac, 8, 9, 11 [13]