

Last day's Work:

Factoring WS #(3,4)def, 6acd, 9, 10, 11gijo, 12bg [13]

Work Ahead: p. 132 #1, 4ac, 6cfg, 7

Optional Sheet: Common Factoring

b. Factor.

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

let $w = x+y$

$w^2 + 9w - 10$

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

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

d) $(x^2 + 4x)^2 + 8(x^2 + 4x) + 15$

let $w = x^2 + 4x$

$w^2 + 8w + 15$

$= (w + 5)(w + 3)$

$= (x^2 + 4x + 5)(x^2 + 4x + 3)$

$= (x^2 + 4x + 5)(x + 3)(x + 1)$

Optional Sheet:

Extra Class Question

e) $5m^2 + 10mn - 3m - 6n$

$= 5m(m+2n) - 3(m+2n)$

$= (m+2n)(5m-3)$

x) $\ell^2 - 4p^2 - 12p - 9$

$= \ell^2 - (4p^2 + 12p + 9)$

$= \ell^2 - (2p+3)(2p+3)$

$= \ell^2 - (2p+3)^2$

let $q = 2p+3$

$\therefore \ell^2 - q^2$

$(\ell - q)(\ell + q)$

$= (\ell - (2p+3))(\ell + (2p+3))$

$= (\ell - 2p - 3)(\ell + 2p + 3)$

Today's Learning Goal(s):

Date: Feb. 13 / 19
 (Every lesson)

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

- simplify a rational expression.
- state the restrictions for a rational expression .

2.4 Simplifying Rational Functions

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

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

$$\begin{aligned} \text{a) } & \frac{20}{25} \\ &= \frac{4 \cancel{5}}{\cancel{5} \cdot 5} \\ &= \frac{4}{5} \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{3 \cancel{15} x^2 y}{20 \cancel{x^3} y} \quad \text{Restrictions:} \\ &= \frac{3}{4} x^{2-3} y^{1-1} \\ &= \frac{3}{4} x^{-1} y^0 \\ &= \frac{3}{4} \left(\frac{1}{x}\right)^1 (1) \\ &= \frac{3}{4x} \end{aligned}$$

$$\left. \begin{aligned} &= \left(\frac{1}{x}\right)^3 \Bigg| = \left(\frac{1}{5}\right)^2 \\ &= \frac{1}{25} \end{aligned} \right\}$$

Simplify. State any restrictions on the variable.

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

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

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

Rest: $x \neq 0$

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

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

$$= \frac{3x}{x-2}, \text{ Rest: } x \neq 0, 2$$

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

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

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

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

*Opposites:

$$2-x$$

$$= -1(-2+x)$$

$$= -1(x-2)$$

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

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

Rest: $x \neq 2$

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

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

R: $2t-1 \neq 0$

$$2t \neq 1$$

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

or $2t+1 \neq 0$

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

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

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

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

$$x \neq y$$

$$\begin{cases} 2x \neq y \\ \text{or } y = \frac{1}{2}x \end{cases}$$

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

a) $x = 3$

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

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

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

$$= -4$$

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

if $x = 3$

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

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

$$= -4$$

b) $x = 2$

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

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

$$= \frac{0}{0}$$

\therefore undefined

👉 "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?

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Work Ahead: p. 132 #1, 4ac, 6cfg, 7

Today's Homework Practice includes:

READ pp.108-112

pp. 112-114 #(1 – 7)ace, 10 [16, 17]

Work Ahead: p. 132 #1, 4ac, 6cfg, 7, 8, 9ab

Note for p.132 **the textbook is incorrect for** 8a, 8e, and 13c

The correct answers are: 8a) $2x^2y(y^3 - 3x^3y^2 + 4x)$

$$8e) (a-2)(a+2)(a^2 + 4)$$

$$13c) \frac{x(x-1)}{y(y+1)}$$

If finished, all of the above, you may wish to work ahead on tomorrow's work:

READ pp.117-121

pp. 122-123 #(4 – 7)ac, 8, 9, 11 [13]