

Name: _____

Date: _____

Notes

Algebra Section 12.4

Pages 794-800

Goal: "You will simplify rational expressions."



Rational expression: an expression that can be written as a ratio of 2 polynomials, where the denominator is not 0

Excluded values: numbers that would make the rational expression undefined (the denominator = 0)

Find excluded values for each rational expression:

Ex: $\frac{x+8}{10x}$

$x \neq 0$

Ex: $\frac{5}{2y+14}$

$2y + 14 \neq 0$
 $y \neq -7$

Ex: $\frac{4v}{v^2-9}$

$v^2 - 9 \neq 0$
 $v \neq \pm 3$

Ex: $\frac{7w+2}{8w^2+w+5}$

None

Ex: $\frac{x+2}{3x-5}$

$x \neq \frac{5}{3}$

Ex: $\frac{2}{5y^2+2y+3}$

None

Ex: $\frac{n-6}{2n^2-5n-12}$

$(2n-3)(n-4)$
 $n \neq \frac{3}{2}, n \neq 4$

Ex: $\frac{2m}{m^2-4}$

$(m+2)(m-2)$
 $m \neq \pm 2$

Simplest Form: a rational expression is in simplest form when the numerator and denominator have no common factors other than 1

Simplify each rational expression and state the excluded values.

Ex: $\frac{r}{2r}$

$r \neq 0, \frac{1}{2}$

Ex: $\frac{5x}{5(x+2)}$

$x \neq -2, \frac{x}{x+2}$

Ex: $\frac{6m^3 - 12m^2}{18m^2}$

$m \neq 0, \frac{m-2}{3}$

Ex: $\frac{y}{7-y}$

$y \neq 7, \text{simplified}$

Ex: $\frac{4a^3}{22a^6}$

$a \neq 0, \frac{2}{11a^3}$

Ex: $\frac{2c}{c+5}$

$c \neq -5, \text{simplified}$

Ex: $\frac{2s^2 + 8s}{3s + 12}$

$s \neq -4, \frac{2s}{3}$

Ex: $\frac{8x}{8x^3 + 16x^2}$

$x \neq 0 \text{ or } -2, \frac{1}{x^2+2x}$

Simplify by factoring into binomials and state excluded values:

Ex: $\frac{x^2 - 3x - 10}{x^2 + 6x + 8}$

$\frac{(x-5)(x+2)}{(x+4)(x+2)}, x \neq -4 \text{ or } -2$

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

Ex: $\frac{x^2 + x - 12}{x^2 - x - 6}$

$\frac{(x-3)(x+4)}{(x-3)(x+2)}, x \neq 3 \text{ or } -2$

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

$$\mathbf{Ex:} \frac{x^2 + 3x + 2}{x^2 + 7x + 10}$$

$$\frac{(x+2)(x+1)}{(x+5)(x+2)}, x \neq -5 \text{ or } -2$$

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

$$\mathbf{Ex:} \frac{y^2 - 64}{y^2 - 16y + 64}$$

$$\frac{(y-8)(y+8)}{(y-8)(y-8)}, y \neq 8$$

$$\frac{y+8}{y-8}$$

Recognize Opposites:

$$\mathbf{Ex:} \frac{x^2 - 7x + 12}{16 - x^2}$$

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

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

$$\mathbf{Ex:} \frac{5 + 4z - z^2}{z^2 - 3z - 10}$$

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

$$-\frac{z+1}{z+2}$$

$$\mathbf{Ex:} \frac{x^2 - 7x + 10}{25 - x^2}$$

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

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