

September 11th, 2008

1.6 Simplifying Rational Expressions

algebraic expression $3x-5+2z^2$

rational number $\frac{a}{b}$ $a, b \in \mathbb{I}, b \neq 0$

rational expression $\frac{3x-5+2z^2}{4+5x}$

Simplify

a) $\frac{15a}{30a^2b}$

b) $\frac{-7a^2b^7}{21a^5b^3}$

c) $\frac{4x-12}{5x-15}$

=

= $\frac{-b^4}{3a^3}$

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

= $\frac{4}{5}$

check
restrictions

* Restrictions (denom. only)

- after factoring
- before factoring

from c) $\frac{4}{5(x-3)}$

consider factors with variables

$$x-3 \neq 0$$

$$x \neq 3$$

$$d) \frac{4a}{3a+a^2}$$

$$= \frac{4a}{a(3+a)}$$

$$= \frac{4}{3+a}$$

$$a \neq -3 \\ 3+a \neq 0$$

$$e) \frac{8x+2}{16x+4}$$

$$= \frac{2(4x+1)}{4(4x+1)}$$

$$= \frac{1}{2}$$

$$x \neq -\frac{1}{4}$$

$$f) \frac{2x^2+2y}{5x^2+5y}$$

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

$$= \frac{2}{5}$$

$$x^2+y \neq 0 \\ x^2 \neq -y$$

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

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

$$x \neq 3$$

$$h) \frac{x+5}{x^2+x-20}$$

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

$$= \frac{1}{x-4}$$

$$x \neq -5, 4$$

$$i) \frac{15-3x}{x^2-7x+10}$$

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

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

$$x \neq +2 \\ x \neq 5$$

$$j) \frac{x^2-2x-15}{x^2-x-12}$$

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

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

$$x \neq 4, -3$$

$$k) \frac{y^2 - 16x^2}{8x^2 + 14xy + 3y^2}$$

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

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

$$2x+3y \neq 0$$

$$2x \neq -3y$$

$$x \neq \frac{-3y}{2}$$

$$4x+y \neq 0$$

$$y \neq -4x$$

$$l) \frac{6x^2 - 23xy + 20y^2}{14x^2y - 35xy^2}$$

$$= \frac{(3x-4y)(2x-5y)}{7xy(2x-5y)}$$

$$= \frac{3x-4y}{7xy}$$

$$y \neq 0$$

$$x \neq \frac{5y}{2}, 0$$

