

Section 8.2 / 8.3 Review - Add / sub / mult / div Rational Expressions

$$1) \frac{6x^2 - 60x}{x^2 - 8x - 20} \cdot \frac{x^2 + 8x + 12}{6x}$$

$$\frac{\cancel{6x}(x-10)}{(x-10)\cancel{(x+2)}} \cdot \frac{(x+6)\cancel{(x+2)}}{\cancel{6x}}$$

$x+6, x \neq 10, -2, 0$

$$2) \frac{2x+20}{x^2+14x+40} \div \frac{6x-48}{x^2-4x-32}$$

$$\frac{\cancel{2}(x+10)}{(x+4)\cancel{(x+10)}} \cdot \frac{(x-8)\cancel{(x+4)}}{\cancel{6}(x-8)}$$

$\frac{2}{6} = \frac{1}{3}, x \neq -4, -10, 8$

$\frac{3x^3}{2z^2(x+y)}$

$$3) \frac{x^2 - y^2}{4x^2 z^4} \cdot \frac{y-x}{xz}$$

$$\frac{\cancel{6}x^4 z}{x^2 + 2xy + y^2} = \frac{(x-y)\cancel{(x+y)}}{4x^2 z^4} \cdot \frac{xz}{y-x} \cdot \frac{\cancel{6}x^4 z}{x^2 + 2xy + y^2}$$

$$\frac{xz}{-4x^2 z^4} \cdot \frac{xz}{x+y} \cdot \frac{\cancel{6}x^4 z}{-4x^2 z^4 (x+y)}$$

$$= \frac{-3x^3}{2z^2(x+y)}, x \neq 0, z \neq 0, x \neq -y$$

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

$$\frac{3x}{(x+5)(x+1)} - \frac{4}{(x+1)(x+1)}$$

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

$$\frac{3x^2+3x-4x-20}{(x+5)(x+1)^2}$$

$$\frac{3x^2-x-20}{(x+5)(x+1)^2}, x \neq -5, -1$$

$$5) \frac{3x}{x-b} - \frac{4}{x-3}$$

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

$$\frac{3x^2-9x-4x+24}{(x-b)(x-3)}$$

$$\frac{3x^2-13x+24}{(x-b)(x-3)}$$

$$x \neq b, 3$$

$$b) \frac{x}{4} + \frac{2}{x} \rightsquigarrow \frac{x^2}{4x} + \frac{8}{4x} = \frac{x^2+8}{4x}$$

$$5 + \frac{x}{3} \rightsquigarrow \frac{5}{1} + \frac{x}{3} = \frac{15}{3} + \frac{x}{3} = \frac{x+15}{3}$$

$$\frac{x^2+8}{4x} \cdot \frac{3}{x+15} = \frac{3(x^2+8)}{4x(x+15)}, x \neq 0, -15$$

$$7) \frac{\frac{4}{x+1}}{b - \frac{3}{x}} = \frac{4}{x+1} \cdot \frac{x}{b(x-3)} = \frac{4x}{3(x+1)(2x-1)}, x \neq -1, 1/2, 0$$

$$\downarrow$$

$$\frac{b}{1} - \frac{3}{x}$$

$$\frac{bx}{x} - \frac{3}{x} = \frac{bx-3}{x}$$