# Rational Expressions

Obj: Write rational expressions in lowest terms

Ex) Write the rational expression in lowest terms

No! CAN'T DO

$$\frac{a^2-a-6}{a^2+5a+6} = \frac{1}{5}$$

Factor both numerator and denominator

$$\frac{a^2-a-6}{a^2+5a+6} = \frac{(a-3)(a+2)}{(a+3)(a+2)}$$

Cancel "common" factors

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

Ex) Write in lowest terms

Difference of Squares →

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

$$= \boxed{\frac{y-2}{2}}$$

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Rat'l Expressions (cont.) 4/30/14

Ex) $\frac{3y+9}{y^2-9}$ Simplify

$y^2-9 \rightarrow y^2-(3)^2$

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

Simplify/Reduce to lowest terms

Ex) $\dfrac{y^2+2y-3}{y^2-3y+2}$

$$\frac{(y+3)\cancel{(y-1)}}{(y-2)\cancel{(y-1)}} = \boxed{\frac{y+3}{y-2}}$$

Ex) $\dfrac{y+2}{y^2+4} = \dfrac{\cancel{y+2}}{\cancel{(y+2)(y+2)}}$

Already in lowest terms

~~Ex)~~

① $\dfrac{x^2(x+1)}{x(x+1)} = \dfrac{x^2}{x} = x$

③ $\dfrac{4x(x+3)}{28x^2(x-3)} = \dfrac{1(x+3)}{2x(x-3)} = \dfrac{x+3}{2x(x-3)}$

⑤ $\dfrac{x^2+2x-15}{x^2+6x+5} = \dfrac{(x-3)(x+5)}{(x+1)(x+5)}$

$= \boxed{\dfrac{x-3}{x+1}}$

4/30/14

Write in lowest terms

Independent Practice

① $\frac{x^2(x+1)}{x(x+1)}$

② $\frac{(x+4)(x-3)}{(x+5)(x+4)}$

③ $\frac{4x(x+3)}{8x^2(x-3)}$

④ $\frac{6m+18}{7m+21}$

⑤ $\frac{x^2+2x-15}{x^2+6x+5}$

Bridge Math Homework 4/30/14

① $\dfrac{5s-25}{s^2-25}$

② $\dfrac{y^2-5y-14}{y^2+y-2}$

Simplify

③ $\dfrac{8x^2-10x-3}{8x^2-6x-9}$

④ $\dfrac{12x^2-4x-5}{8x^2-6x-5}$

* ⑤ $\dfrac{(x+2)(x+1)}{(x+3)(x-2)} \cdot \dfrac{(x+3)(x+4)}{(x+2)(x+1)}$

# Solutions to HW Problems from 4/30/14

Write each rational expression in lowest terms.

① $\dfrac{5s-25}{s^2-25} = \dfrac{5(s-5)}{(s-5)(s+5)} = \boxed{\dfrac{5}{s+5}}$

Diff of two squares

② $\dfrac{y^2-5y-14}{y^2+y-2} = \dfrac{(y+2)(y-7)}{(y+2)(y-1)} = \boxed{\dfrac{y-7}{y-1}}$

③ $\dfrac{8x^2-10x-3}{8x^2-6x-9} = \dfrac{(4x+1)(2x-3)}{(4x+3)(2x-3)} = \boxed{\dfrac{4x+1}{4x+3}}$

(4) $\dfrac{12x^2-4x-5}{8x^2-6x-5} = \dfrac{(6x+5)(2x-1)}{}$

$\Downarrow$

$$\frac{(6x-5)(2x+1)}{(4x-5)(2x+1)} = \boxed{\frac{6x-5}{4x-5}}$$

Sidebar: $4x-5 \neq 0$

$4x \neq 5$

$x \neq \frac{5}{4}$

(5) $\dfrac{(x+2)(x+1)}{(x+3)(x-2)} \cdot \dfrac{(x+3)(x+4)}{(x+2)(x+1)} =$

$$\boxed{\frac{x+4}{x-2}}$$

5/7/14

# Practice and Problem Solving

Write each rational expression in lowest terms.

① $\frac{(2x+7)(x-1)}{(2x+3)(2x+7)}$

② $\frac{5y^2(y+8)}{15y(y+8)}$

③ $\frac{5r-20}{3r-12}$

④ $\frac{2t+6}{t^2-9}$

⑤ $\frac{x^2-25}{x^2+x-20} \cdot \frac{x^2+7x+12}{x^2-2x-15}$