6.1 Equivalent Rational Expressions -part 2

Equivalent Expressions

remember $\frac{2^{\times 2}}{3_{\times 2}} = \frac{4}{6} = \cdots\cdots$ $\qquad \frac{60 \div 12}{48 \div 12} = \frac{5}{4}$

— mult. or div. the numerator + denominator by the same value.

- Same for rational expressions — look for common factors to divide away and simplify.

ex. 1 $\qquad \frac{25\,a^3b^2}{15\,a^4b}$ $\qquad$ Simplify

$\div 5$ $\qquad$ exponent law — positive exponents only

$\rightarrow a, b \neq 0$

$$= \frac{5\,a^{-1}b^1}{3}$$

$$= \frac{5b}{3a}$$

2. $\frac{(x+5)(x+2)}{3(x+5)}$ $\qquad$ MUST BE IN FACTORED FORM!!

$\rightarrow x+5 \neq 0$

$x \neq -5$

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

3. $\dfrac{6x^2+12x}{2x}$ → $2x \neq 0$, $x \neq 0$

FACTOR!! GCF

$= \dfrac{6x(x+2)}{2x}$

$= 3(x+2)$

4. $\dfrac{x^2-49}{x^2-5x-14}$

FACTOR!!

G.C.F.
bi - diff of sq.
tri -

$+ -5$, $\times -14$ → $-7, 2$

$= \dfrac{(x-7)(x+7)}{(x-7)(x+2)}$ → $x \neq 7, -2$

$= \dfrac{(x+7)}{(x+2)}$

5. $\dfrac{x^2+6x+8}{x^2-4}$

tri $+6$, $\times 8$

diff of sq.

FACTOR

$= \dfrac{(x+4)(x+2)}{(x+2)(x-2)}$ → non permissible

$= \dfrac{\cancel{(x+2)}(x-2)}{\cancel{(x+2)}(x-2)}$ → non permissible $x \neq -2, 2$

$= \dfrac{(x+4)}{(x-2)} =$

6. $\dfrac{2x^2-5x-3}{9-x^2}$ ← ⊕ −5, ⊗ −6 (−6, 1) ← diff of sq.

$(x-\frac{6}{2})(x+\frac{1}{2})$

$(x-3)(2x+1)$

$= \dfrac{(x-3)(2x+1)}{(3+x)(3-x)}$ (×)

(×) $(x-3), (3-x)$ similar change signs in ONE of them → Factor (−1)

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

$= \dfrac{(2x+1)}{-(3+x)}$ OR $\dfrac{2x+1}{-(x+3)}$ OR $\dfrac{-(2x+1)}{(x+3)}$ OR $\dfrac{-2x-1}{x+3}$

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