Simplifying Rational Expressions

Note Title 29/11/2017

I. Step 1: Identify "non-permissable values"

Recall that division by zero is undefined e.g. $\frac{3}{0}$ not possible

e.g. 1 $\frac{132a^4}{12a^2}$ $a \neq 0$ $11a^2$

e.g. 2 $\frac{(x+2)}{(x+2)(x-2)}$ x^2-4

- Factor denominator
- Identify values

$x \neq -2, +2$

$\frac{1}{x-2}$

Second Step: Cancel any common factors top/bottom.

Most times it is necessary to factor both top/bottom first

$\frac{2x-7}{2x^2-x-21}$ → messy trinomial

$a \times c = -42$

$b = -1$

$+6, -7$

$2x^2+6x-7x-21$

$2x(x+3)-7(x+3)$

$(2x-7)(x+3)$

non permissable: $x \neq -3, \frac{7}{2}$

$\frac{2x-7}{(2x-7)(x+3)}$

$\frac{1}{x+3}$

$\frac{3b^2+3b-60}{2b^2+4b-48}$ FACTOR TOP/BOTTOM

$3(b-4)(b+5)$

$\frac{3(b^2+b-20)}{2(b^2+2b-24)}$

$(b+6)(b-4)$

$\frac{3(b-4)(b+5)}{2(b+6)(b-4)}$

$b \neq 4, -6$

$\frac{3(b+5)}{2(b+6)}$

II Negative trick:

Reverse a factor is easy when +

$(x+2) = (2+x)$

But when (−) . . .

$x-1$ $-(1-x)$

because $-1(-x+1)$ ↑ Same

$-1(1-x)$

Always add a negative one infront when changing order.

simplify

$$\frac{9-3x}{x-3} \qquad x \neq 3$$

FACTOR $\frac{3(3-x)}{(x-3)}$

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

$\frac{3}{-1}$ or -3 //