$$\frac{b-5}{5-b}=\frac{b-5}{-(-5+b)}=\frac{b-5}{-(b-5)}=-1$$

Factorization:

$$\frac{5}{-1}+\frac{-b}{-1}=-(-5+b)$$

Multiplying Rational expressions

Let's learn how to do it:

$$\frac{5xy^3}{8x^2z^2}\times\frac{16z^3}{15y^2}=\frac{yz}{x3}$$

$$\frac{5\div 5}{15\div 5}=\frac{1}{3}\qquad \frac{16\div 8}{8\div 8}=\frac{2}{1}$$

$$\frac{y^3}{y^2}=y^{3-2}=y\qquad \frac{x}{x^2}=x^{1-2}=x^{-1}=\frac{1}{x}$$

Examples:

$$\frac{x+3}{x}\times\frac{x^2}{x^2-2x-15}=$$

Identity IV

Find two numbers that:

$3\times(-5)=-15$

$3+(-5)=-2$

We rewrite expression:

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

factorization

$$\frac{x^2+5x}{x}\times\frac{1}{x^2+10x+25}=\frac{x(x+5)}{x}\times\frac{1}{(x+5)^2}=\frac{1}{x+5}$$

Identity I

To add or subtract two rational expressions with unlike denominator

Let's learn how to do it:

find the least common multiple (LCM) of the two denominators

$$\frac{a}{b}+\frac{c}{d}=\frac{ad+cb}{bd}$$

$(b, d \neq 0)$

$$\frac{1}{3a}+\frac{1}{4b}=\frac{1(4b)}{3a(4b)}+\frac{1(3a)}{4b(3a)}=\frac{4b+3a}{12ab}$$

The LCD of the fraction is 12ab

$$\frac{1}{a-5}+\frac{2}{a}=\frac{1a+2(a-5)}{a(a-5)}=\frac{a+2a-10}{a(a-5)}=\frac{3a-10}{a(a-5)}$$

The LCM of the fraction is $a(a-5)$

Examples:

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

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

Identity IV

$$=\frac{2x+8+x^2+(2-1)x+(-1\times 2)}{x^2+(2+4)x+(2\times 4)}$$

$$=\frac{2x+8+x^2+x-2}{x^2+6x+8}=\frac{x^2+3x+6}{x^2+6x+8}$$