

Skill 2. Simplifying Rational Functions

To express a rational Function to its lowest term or simplest form, we factor out the numerator and the denominator then divide out the common factors.

Reduce the following rational function to its lowest term.

a. $\frac{3x+6}{x^2+7x+10}$

b. $\frac{x^2-16}{x^2-7x+12}$

c. $\frac{x^2-2x-15}{3x^3-9x^2-30x}$

Solution a.

Factor the numerator and the denominator.

$$\frac{3(x+2)}{(x+2)(x+5)}$$

Divide out all common factors. In this case $x+2$

$$\frac{3\cancel{(x+2)}}{\cancel{(x+2)}(x+5)}$$

$$\frac{3}{x+5}$$

Solution b.

Factor the numerator and the denominator.

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

Divide out all common factors. In this case $x-4$

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

$$\frac{x+4}{x-3}$$

Solution c.

Factor the numerator and the denominator.

$$\frac{(x-5)(x+3)}{3x(x^2-3x-10)} = \frac{(x-5)(x+3)}{3x(x-5)(x+2)}$$

Divide out all common factors. In this case $x-5$

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