

2-1 HW Answer Key

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

2. $(3x-1)(x+4)$

3. $\frac{2x^6}{x-3}, x \neq 3$

4. $\frac{1}{3x-1}, x \neq -4, \frac{1}{3}$

5. $\frac{-1}{x-5}, x \neq 5, -4$

6. $6x, x \neq \pm 1$

7. $\frac{5x+1}{4x-1}, x \neq \frac{1}{4}$

8. $\frac{-2x-7}{4x+5}, x \neq -\frac{5}{4}$

9. $\frac{-6}{2x-5}, x \neq \frac{5}{2}$

10. $\frac{x^2-2x+2}{2x+7}, x \neq -\frac{7}{2}$

11. The denominator will always be the opposite sign of the numerator.

Alg 2 Homework 2-1

Name Key (2016)Factor.

1. $6x^2 - 7x - 3$

$$P = -18$$

$$S = -7$$

$$\{-9, 2\}$$

$$6x^2 - 9x + 2x - 3$$

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

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

2. $3x^2 + 11x - 4$

$$P = -12$$

$$S = 11$$

$$\{12, -1\}$$

$$3x^2 + 12x - 1x - 4$$

$$3x(x + 4) - 1(x + 4)$$

$$(x + 4)(3x - 1)$$

Simplify. Identify any x-values for when the expression is undefined.

3. $\frac{4x^6}{2x - 6} = \frac{2x^6}{x - 3}$

$\{x | x \neq 3\}$

$\frac{2x^6}{x - 3}$

4. $\frac{x + 4}{3x^2 + 11x - 4}$

$$= \frac{x + 4}{(x + 4)(3x - 1)} = \frac{1}{3x - 1}$$

$$\{x | x \neq -4, \frac{1}{3}\}$$

5. $\frac{-x - 4}{x^2 - x - 20} = \frac{-1(x + 4)}{(x - 5)(x + 4)}$

$\{x | x \neq 5, -4\}$

$\frac{-1}{x - 5}$

6. $\frac{6x^3 - 6x}{x^2 - 1} = \frac{6x(x^2 - 1)}{(x + 1)(x - 1)} = 6x$

$\{x | x \neq \pm 1\}$

Add or subtract. Identify any x-values for when the expression is undefined.

$$7. \frac{2x-3}{4x-1} + \frac{3x+4}{4x-1} = \boxed{\frac{5x+1}{4x-1}}$$

$\{x | x \neq 1/4\}$

$$8. \frac{3x-4}{4x+5} - \frac{5x+3}{4x+5} = \boxed{\frac{-2x-7}{4x+5}}$$

$\{x | x \neq -5/4\}$

$$9. \frac{4x-3}{2x-5} - \frac{4x+3}{2x-5} = \boxed{\frac{-6}{2x-5}}$$

$\{x | x \neq 5/2\}$

$$10. \frac{x^2-3}{2x+7} - \frac{2x-5}{2x+7} = \boxed{\frac{x^2-2x+2}{2x+7}}$$

$\{x | x \neq -7/2\}$

11. Explain why $\frac{a-b}{b-a} = -1$.

$$\frac{a-b}{-1(a-b)} = -1$$

$-1 = -1 \checkmark$

The denominator will always be the opposite sign of the numerator.

Rational Expressions

Warm-Up:

a. Simplify: $\frac{x^2 - x - 6}{x^2 - 4} = \frac{(x-3)(\cancel{x+2})}{(x-2)(\cancel{x+2})} = \boxed{\frac{x-3}{x-2}}$

b. Evaluate your answer for

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

2) $x = 3$ $\frac{3-3}{3-2} = \frac{0}{1} = 0$

3) $x = -2$ $\frac{-2-3}{-2-2} = \frac{-5}{-4} = \frac{5}{4}$

c. Evaluate $\frac{x^2 - x - 6}{x^2 - 4}$ for:

1) $x = 1$ $\frac{1^2 - 1 - 6}{1^2 - 4} = 2$

2) $x = 3$ $\frac{3^2 - 3 - 6}{3^2 - 4} = \frac{0}{5} = 0$

3) $x = -2$ $\frac{(-2)^2 - (-2) - 6}{(-2)^2 - 4} = \frac{0}{0} \neq \frac{5}{4}$

d. Do you always get the same answer? Why or why not?

$x = -2$ gives different answers because when $x = -2$ ^{is substituted in} the original fraction would be undefined, but the simplified fraction would not be.

Adding or Subtracting UNLike Denominators:

- a. Factor Denominators if possible
- b. Find LCD using factors
- c. Multiply each fraction by missing factor(s)
(Ask yourself, "How can I multiply to get my denominators the same?")
- d. Add or subtract numerators - Keep denominator
- e. Factor numerator - if possible
- f. Simplify (by dividing common factors)

$$\text{Ex: } \frac{2}{5} + \frac{1}{3} = \frac{2}{5} \left(\frac{3}{3} \right) + \frac{1}{3} \left(\frac{5}{5} \right) = \frac{6}{15} + \frac{5}{15} = \frac{11}{15} \quad \text{so...} \quad \frac{2}{5x} + \frac{1}{3x} = \frac{2}{5x} \left(\frac{3}{3} \right) + \frac{1}{3x} \left(\frac{5}{5} \right) = \frac{6}{15x} + \frac{5}{15x} = \frac{11}{15x}$$

$$1. \left(\frac{2}{2}\right) \frac{x}{3} - \frac{3x}{2} \left(\frac{3}{3}\right)$$

$$\frac{2x}{6} - \frac{9x}{6}$$

$$\boxed{\frac{-7x}{6}}$$

$$2. \left(\frac{2a}{2a}\right) \frac{4}{1} - \frac{3}{2a} \quad \begin{matrix} 2a \neq 0 \\ a \neq 0 \end{matrix}$$

$$\frac{8a}{2a} - \frac{3}{2a} = \boxed{\frac{8a-3}{2a}}$$

$$3. \left(\frac{x}{x}\right) \frac{3}{x+1} - \frac{2}{x} \left(\frac{x+1}{x+1}\right)$$

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

$$\boxed{\frac{x-2}{x(x+1)}} \quad x \neq 0, -1$$

$$\frac{x(x+1) \neq 0}{x \neq 0 \mid x+1 \neq 0}$$

$$x \neq -1$$

$$\left(\frac{x+3}{x+3}\right) \frac{4}{x-1} + \frac{5}{x+3} \left(\frac{x-1}{x-1}\right)$$

$$\frac{4x+12}{(x+3)(x-1)} + \frac{5x-5}{(x+3)(x-1)}$$

$$\boxed{\frac{9x+7}{(x+3)(x-1)}} \quad x \neq 1, -3$$

$$\begin{matrix} x+3 \neq 0 & x-1 \neq 0 \\ x \neq -3 & x \neq 1 \end{matrix}$$

5. $\frac{7}{x-5} + \frac{4}{5-x} \left(\frac{-1}{-1} \right)$

$$\frac{7}{x-5} + \frac{-4}{x-5}$$

$$\boxed{\frac{3}{x-5}} \quad x \neq 5$$

$\left(\frac{m+1}{m+1} \right) \frac{2}{m-1} + \frac{3}{m+1} \left(\frac{m-1}{m-1} \right) \frac{4}{m^2-1} \quad m \neq \pm 1$

$$\frac{2m+2}{(m+1)(m-1)} + \frac{3m-3}{(m+1)(m-1)} - \frac{4}{(m+1)(m-1)}$$

$$\frac{5m-5}{(m+1)(m-1)} = \frac{5(\cancel{m-1})}{(m+1)\cancel{(m-1)}} = \boxed{\frac{5}{m+1}}$$

$\left(\frac{y+1}{y+1} \right) \frac{y+2}{y^2-y} - \frac{6}{y^2-1} \left(\frac{y}{y} \right)$

Double Dist. $y \neq 0, 1, -1$

$$\frac{y^2+3y+2}{y(y+1)(y-1)} - \frac{6y}{y(y+1)(y-1)}$$

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

8 $\left(\frac{3}{3} \right) \frac{x-1}{x^2-x-2} - \frac{1}{3x+3} \left(\frac{x-2}{x-2} \right)$

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

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

$$\boxed{\frac{2x-1}{3(x-2)(x+1)}} \quad x \neq 2, -1$$

Discuss with partner and write a response:

- Describe the process for adding/subtracting rational expressions with UNlike denominators.