Intro to Rational Expressions

Fractions and Exponents Review

Fractions Review

Adding and Subtracting Fractions

Always find a common denominator when adding or subtracting fractions!

a) $\frac{1^{\times 4}}{2_{\times 4}} + \frac{1}{8}$

$= \frac{4}{8} + \frac{1}{8}$

$= \frac{5}{8}$ (keep denominator)

b) $\frac{2x^{\times 2}}{3y_{\times 2}} - \frac{y^{\times 3y}}{2_{\times 3y}}$

common denom $= 3y(2)$
$= 6y$

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

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

Multiplying and Dividing Fractions

You do NOT need a common denominator when multiplying or dividing fractions!

a) $\frac{3}{2} \cdot \frac{4}{5}$

$= \frac{(3)(4)}{(2)(5)}$

$= \frac{12}{10}$

$= \frac{6}{5}$

b) $\frac{2}{3} \div \frac{4}{3}$

* Flip second fraction and multiply *

$= \frac{2}{3} \times \frac{3}{4}$

$= \frac{6}{12}$

$= \frac{1}{2}$

Rule: We can <u>NEVER</u> have a fraction with a denominator of 0. Why?

eg. $\frac{6}{2} = 3$

why? because $2 \times 3 = 6$

$\frac{6}{0} = ?$

This means $0 \times \underline{?} = 6$

Rule: Cross multiplication of fractions only happens when...... There is an = sign between two fractions.

eg. $\frac{2}{3} = \frac{x}{5}$

$5(2) = 3x$

$10 = 3x$

$x = \frac{10}{3}$

Rule: We can cancel out ONLY when multiplying fractions

You can cancel factors.

eg. $\frac{\cancel{x}(x+1)}{\cancel{x}} = x+1$

eg. $\frac{\cancel{6}^{3}\cancel{x}(x+3)}{\cancel{4}_{2}\cancel{x}} = \frac{3x+9}{2}$

These are examples of when cancelling is allowed.

Rule: We can NOT cancel out when adding or subtracting fractions

e.g. $\frac{\cancel{x}+8}{\cancel{x}}$ NO! Don't do this!

e.g. $\frac{2x+3}{4x}$ No cancelling!

Name	Rule	Examples
Adding and Subtracting Monomials	COMBINE LIKE TERMS! (do not change common variables and exponents)	$3x^2y + 2x^2y =$ $5x^2y$
Product Rule	$x^a \cdot x^b = x^{a+b}$	$(-2x^2y)(3x^3y^2) =$ $-6x^5y^3$
Quotient Rule	$\frac{x^a}{x^b} = x^{a-b}$	$\frac{28x^5}{42x} = \frac{2x^4}{3}$
Power of a Power Rule	$(x^a)^b = x^{a \times b}$	$(-2x^3)^2 =$ $4x^6$
Negative Exponent Rule	$x^{-a} = \frac{1}{x^a}$	$\frac{4x^2}{8x^5} = \frac{1}{2x^3}$
Exponent of Zero	$x^0 = 1$	$87^0 =$ 1

Simplify the following rational expressions using exponent laws

a) $$\frac{12k^2m^8}{4k^5m^5} = 3k^{-3}m^3$$

$$= \frac{3m^3}{k^3}$$

b)

$$\frac{5c^3d \cdot 4c^2d^2}{(2c^2d)^2} = \frac{20c^5d^3}{4c^4d^2}$$

$$= 5cd$$

c)

$$\frac{(3xy)^3}{9x^4y^4} = \frac{27x^3y^3}{9x^4y^4}$$

$$= 3x^{-1}y^{-1}$$

$$= \frac{3}{xy}$$

d)

$$\frac{(2z^3)^{-2}}{w^5 z^2} = \frac{2^{-2} z^{-6}}{w^5 z^2}$$

$$= \frac{1}{2^2 w^5 z^2 z^6}$$

$$= \frac{1}{4w^5 z^8}$$

e)

$$\frac{(x^{-4})^5 x^3}{3x^{-1}} = \frac{x^{-20} x^3}{3x^{-1}}$$

$$= \frac{x^{-17}}{3x^{-1}}$$

$$= \frac{1}{3x^{-1} x^{17}}$$

$$= \frac{1}{3x^{16}}$$

Combining fractions and exponents:

ex. $$\frac{3x^{\cancel{3}\,1}}{2\cancel{x^2}}+\frac{4y^{\cancel{4}\,3}}{3\cancel{y}}$$

$$= \frac{3x^{\times 3}}{2^{\times 3}} + \frac{4y^{3\;\times 2}}{3^{\times 2}}$$

$$= \frac{9x}{6} + \frac{8y^3}{6}$$

$$= \frac{9x+8y^3}{6}$$

COMPLETE WORKSHEET

Intro to Rational exponents (Fractions):

bottom (also called the index)

$$\sqrt[2]{x^{1}}$$

top

radicand.

$$= x^{\frac{1}{2}}$$

Powers with a rational exponent of the form $\dfrac{1}{n}$

A power involving a rational exponent with numerator 1 and denominator *n* can be interpreted as the *n*th root of the base:

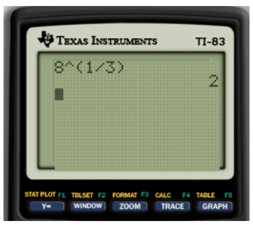
$$\boxed{b^{\frac{1}{n}} = \sqrt[n]{b}}$$

Powers with a rational exponent of the form $\frac{1}{n}$

Example 1: Evaluate each of the following

a) $8^{\frac{1}{3}}$

$= 2$



b) $\sqrt[5]{-32}$

$= (-32)^{\frac{1}{5}}$

$= -2$

c) $-16^{\frac{1}{4}}$

$= -2$

d) $\sqrt[4]{\frac{16}{81}}$

$= \left(\frac{16}{81}\right)^{\frac{1}{4}}$

$= \frac{(16)^{\frac{1}{4}}}{(81)^{\frac{1}{4}}}$

$= \frac{2}{3}$

e) $(-27)^{-\frac{1}{3}}$

$= \frac{1}{(-27)^{1/3}}$

$= \frac{1}{-3}$

$= -\frac{1}{3}$

Powers with a rational exponent of the form $\frac{m}{n}$

You can evaluate a power involving a rational exponent with numerator *m* and denominator *n* by taking the *n*th root of the base raised to the exponent *m*:

$$\boxed{b^{\frac{m}{n}} = \left(\sqrt[n]{b}\right)^m = \sqrt[n]{b^m}}$$

Powers with a rational exponent of the form $\frac{m}{n}$

Example 2: Simplify each of the following powers

a) $\sqrt[5]{y^2}$

$= y^{\frac{2}{5}}$

b) $\sqrt[3]{x}$

$= x^{\frac{1}{3}}$

c) $\sqrt{a^{-3}b^{\frac{4}{3}}}$

$= \left(a^{-3}b^{4/3}\right)^{1/2}$

$= a^{-3/2}b^{4/6}$

$= \dfrac{b^{2/3}}{a^{3/2}}$

d) $\sqrt[4]{x^3y^2}$

$= \left(x^3y^2\right)^{1/4}$

$= x^{3/4}y^{2/4}$

$= x^{3/4}y^{1/2}$

e) $\dfrac{\sqrt[3]{x^2y}\,y^2}{x^3}$

$= \dfrac{(x^2y)^{1/3}\,y^2}{x^3}$

$= \dfrac{x^{2/3}y^{1/3}y^{6/3}}{x^{9/3}}$

$= x^{-7/3}y^{7/3}$

$= \dfrac{y^{7/3}}{x^{7/3}}$

Example 3: Evaluate each of the following

a) $8^{\frac{2}{3}}$

$= \left(8^{1/3}\right)^2$

$= (2)^2$

$= 4$

b) $81^{\frac{5}{4}}$

$= \left(81^{1/4}\right)^5$

$= (3)^5$

$= 243$

c) $\left(\frac{49}{81}\right)^{-\frac{3}{2}}$

$= \left(\frac{81}{49}\right)^{3/2}$

$= \dfrac{(81)^{3/2}}{(49)^{3/2}}$

$= \dfrac{729}{343}$

If you have a power with a negative exponent and a rational base, just flip the base and make the exponent positive.

Apply Exponent Rules

Example 4: Simplify and express answer using only positive exponents

a)

$$\frac{\left(x^{\frac{2}{3}}\right)\left(x^{\frac{2}{3}}\right)}{\left(x^{\frac{1}{3}}\right)} = \frac{x^{4/3}}{x^{1/3}}$$

$$= x^{3/3}$$

$$= x$$

b)

$$\left(y^{\frac{1}{4}}\right)^{2} \times \left(y^{-\frac{1}{3}}\right)^{2}$$

$$= y^{1/2} \times y^{-2/3}$$

$$= y^{3/6} \times y^{-4/6}$$

$$= y^{-1/6}$$

$$= \frac{1}{y^{1/6}}$$

c)

$$\left(5x^{\frac{1}{2}}\right)^2 \times 4x^{-\frac{1}{2}}$$

$= 25x \cdot 4x^{-1/2}$

$= 25x^{2/2} \cdot 4x^{-1/2}$

$= 100x^{1/2}$

d)

$$\frac{(m^{-2})^3\sqrt{m^4}}{m\sqrt{pq^{-3}}} = \frac{m^{-6} \cdot m^{4/2}}{mp^{1/2}q^{-3/2}}$$

$= \frac{m^{-6} \cdot m^2}{mp^{1/2}q^{-3/2}}$

$= \frac{m^{-4}}{mp^{1/2}q^{-3/2}}$

$= \frac{m^{-5}}{p^{1/2}q^{-3/2}}$

$= \frac{q^{3/2}}{m^5p^{1/2}}$

e) $\dfrac{(x^2)^{-4}\sqrt[5]{y^3}}{y\sqrt{x^{-2}y}}$

$$= \frac{x^{-8}y^{3/5}}{y x^{-1} y^{1/2}}$$

$$= \frac{x^{-7}y^{3/5}}{y^{3/2}}$$

$$= \frac{x^{-7}y^{6/10}}{y^{15/10}}$$

$$= x^{-7}y^{-9/10}$$

$$= \frac{1}{x^{7}y^{9/10}}$$

Complete Worksheet

2.1/2.2 Restricting, Simplifying, Multiplying, and Dividing Rational Expressions

Lesson Outline:

Part 1: Stating restrictions

Part 2: Simplifying rational expressions

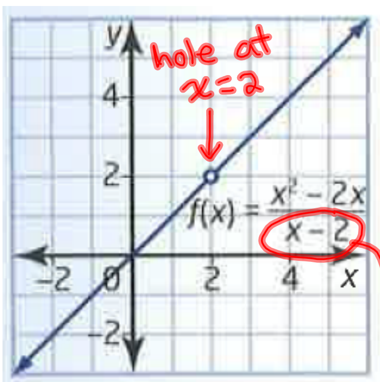
Part 3: Multiplying rational expressions

Part 4: Dividing rational expressions

<u>What is a rational expression?</u>

Rational expression: the quotient of two polynomials, $\frac{p(x)}{q(x)}$, where $q(x) \neq 0$.

Example of a graph of a rational expression:



The open circle is used to represent a hole in the graph. This corresponds to any restrictions on the variable (denominator can't be 0).

$x-2 \neq 0$

$x \neq 2$

<u>Stating Restrictions</u>

Note: rational expressions must be checked for restrictions by determining where the denominator is equal to **<u>zero</u>**. These restrictions must be stated when the expression is simplified.

bottom of a fraction can NOT = 0.

Example 1: State the restrictions for the following rational expressions

a) $\frac{x+2}{x-2}$

$x-2 \neq 0$

$x \neq 2$

$\boxed{x \neq 2}$

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

$x-3 \neq 0$

$x \neq 3$

$x+4 \neq 0$

$x \neq -4$

$\boxed{x \neq 3, -4}$

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

$x \neq 0$

$x+3 \neq 0$

$x \neq -3$

$\boxed{x \neq 0, -3}$

Rule: We can cancel out ONLY when multiplying fractions

You can cancel factors.

eg. $\frac{\cancel{x}(x+1)}{\cancel{x}} = x+1$

eg. $\frac{\overset{3}{\cancel{6}}\cancel{x}(x+3)}{\underset{2}{\cancel{4}}\cancel{x}} = \frac{3x+9}{2}$

These are examples of when cancelling is allowed.

Rule: We can **NOT** cancel out when adding or subtracting fractions

e.g. $\frac{\cancel{x}+8}{\cancel{x}}$ NO! Don't do this!

e.g. $\frac{2x+3}{4x}$ No cancelling!

Simplifying Rational Expressions

Example 2: Simplifying each expression and determine any restrictions on the variable.

a) $\dfrac{3x^{\cancel{2}\,1}}{y\cancel{x}}$, $y \neq 0$, $x \neq 0$

$= \dfrac{3x}{y}$, $y \neq 0$, $x \neq 0$

b) $\dfrac{x-3}{x^2+3x-18}$

Note: *factor where possible and then state restrictions before cancelling factors.*

$= \dfrac{\cancel{x-3}}{(x+6)\cancel{(x-3)}}$, $x \neq -6, 3$

$= \dfrac{1}{x+6}$, $x \neq -6, 3$

c)

$$\frac{\boldsymbol{x^2+10x+21}}{\boldsymbol{x+3}} \quad ; x \neq -3$$

$$= \frac{(x+7)\cancel{(x+3)}}{\cancel{x+3}} \quad ; x \neq -3$$

$$= x+7 \quad ; x \neq -3$$

d)

$$\frac{x+1}{x^2+3x+2}$$

$$= \frac{\cancel{x+1}}{(x+2)\cancel{(x+1)}} \quad ; x \neq -2, -1$$

$$= \frac{1}{x+2}$$

e)

$$\frac{x^2-9}{x^2+7x+12}$$ ← difference of squares: $a^2-b^2=(a-b)(a+b)$

$$=\frac{(x-3)\cancel{(x+3)}}{(x+4)\cancel{(x+3)}}\;;\; x\neq -4,-3$$

$$=\frac{x-3}{x+4}\;;\; x\neq -4,-3$$

f)

$$\frac{\mathbf{6x^2-7x-5}\,*}{\mathbf{3x^2+x-10}\,*}$$

Factor numerator

$6x^2-10x+3x-5$

$=(6x^2-10x)+(3x-5)$

$=2x(3x-5)+1(3x-5)$

$=(2x+1)(3x-5)$

Factor denominator

$3x^2+x-10$

$=3x^2+6x-5x-10$

$=(3x^2+6x)+(-5x-10)$

$=3x(x+2)-5(x+2)$

$=(x+2)(3x-5)$

$$=\frac{(2x+1)\cancel{(3x-5)}}{(x+2)\cancel{(3x-5)}}\;;\; x\neq -2,\frac{5}{3}$$

$$=\frac{2x+1}{x+2}\;;\; x\neq -2,\frac{5}{3}$$

Multiplying Rational Expressions

a)

$$\frac{{}^{2}\cancel{4}x^{\cancel{2}\,1}}{{}_{1}\cancel{3}\cancel{x}} \bullet \frac{{}^{4}\cancel{12}x^{\cancel{3}\,2}}{{}_{1}\cancel{2}\cancel{x}} \quad ; x \neq 0$$

1. factor where possible
2. cancel common factors
3. multiply numerators and denominators
4. state restrictions (throughout process)

$$= 8x^3 \quad ; x \neq 0$$

b)

$$\frac{4x+24}{x^2+8x} \bullet \frac{12x^2}{3x+18}$$

$$= \frac{4\cancel{(x+6)}}{\cancel{x}(x+8)} \cdot \frac{{}^{4}\cancel{12}x^{\cancel{2}\,1}}{{}_{1}\cancel{3}\cancel{(x+6)}} \quad ; x \neq 0, -8, -6$$

$$= \frac{16x}{x+8} \quad ; x \neq 0, -8, -6$$

c)

$$\frac{x+1}{2x} \bullet \frac{3x}{x^2+4x+3} \quad ; x \neq 0$$

$$= \frac{\cancel{x+1}}{2\cancel{x}} \cdot \frac{3\cancel{x}}{\cancel{(x+1)}(x+3)} \quad ; x \neq 0, -1, -3$$

$$= \frac{3}{2(x+3)} \quad ; x \neq 0, -1, -3$$

d)

$$* \frac{5x^2-13x+8}{x-7} \bullet \frac{1}{5x-8}$$

factor
$= 5x^2 - 8x - 5x + 8$
$= (5x^2 - 8x) + (-5x + 8)$
$= x(5x-8) - 1(5x-8)$
$= (5x-8)(x-1)$

$$= \frac{\cancel{(5x-8)}(x-1)}{x-7} \cdot \frac{1}{\cancel{5x-8}} \quad ; x \neq 7, \frac{8}{5}$$

$$= \frac{x-1}{x-7} \quad ; x \neq 7, \frac{8}{5}$$

Dividing Rational Expressions

1. flip second fraction and change to multiplication
2. factor where possible
3. cancel common factors
4. multiply numerators and denominators
5. state restrictions (throughout process)

a)

$$\frac{10ab^2}{4a} \div \frac{15a^2}{12b^2}$$

no cross cancelling until after second fraction has been flipped

$$= \frac{10ab^2}{4a} \times \frac{12b^2}{15a^2} \quad ; \; a \neq 0, \; b \neq 0$$

← because 'b' was in the denominator of the original expression

$$= \frac{2\,\cancel{120}\,\cancel{a}\,b^4}{\cancel{60}\,a^{\cancel{3}\,2}} \quad ; \; a \neq 0, \; b \neq 0$$

$$= \frac{2b^4}{a^2} \quad ; \; a \neq 0, \; b \neq 0$$

b)

$$\frac{a^2+2a}{3a} \div \frac{5a^2+10a}{20a^2}$$

$$= \frac{a^2+2a}{3a} \times \frac{20a^2}{5a^2+10a} \quad ; \; a \neq 0$$

$$= \frac{\cancel{a}\,(\cancel{a+2})}{3\cancel{a}} \times \frac{4\,\cancel{20}\,a^{\cancel{2}\,1}}{\cancel{5a}\,(\cancel{a+2})} \quad ; \; a \neq 0, -2$$

$$= \frac{4a}{3} \quad ; \; a \neq 0, -2$$

c)

$$\frac{2x^2-8x}{x^2-3x-10} \div \frac{4x^2}{x^2-9x+20}$$

$$= \frac{2x^2-8x}{x^2-3x-10} \times \frac{x^2-9x+20}{4x^2} \quad ; x \neq 0$$

$$= \frac{{}^{1}\cancel{2}\cancel{x}(x-4)}{\cancel{(x-5)}(x+2)} \times \frac{\cancel{(x-5)}(x-4)}{{}_{2}\cancel{4}x^{\cancel{2}\,1}} \quad ; x \neq 0, 5, -2, 4$$

$$= \frac{(x-4)^2}{2x(x+2)} \quad ; x \neq 0, 5, -2, 4$$

<u>DO WORKSHEET</u>

2.2 Add and Subtract Rational Expressions

DO IT NOW!

LCD = 30

a) $\frac{1}{6} + \frac{1}{5}$

$\times 5$ ... $\times 6$

$= \frac{5}{30} + \frac{6}{30}$

$= \frac{11}{30}$

Note: *the product of the denominators will give a common denominator (but not always the lowest common denominator)*

b) Simplify and state restrictions

$$\frac{x^2 - 1}{x^2 - 4} \times \frac{x^2 + 3x - 4}{x^2 + 5x + 4} = \frac{(x-1)\cancel{(x+1)}}{(x-2)(x+2)} \times \frac{\cancel{(x+4)}(x-1)}{\cancel{(x+4)}\cancel{(x+1)}}$$

$$= \frac{(x-1)^2}{(x-2)(x+2)} \; ; \; x \neq 2, -2, -4, -1$$

c) $\dfrac{{}^{2x}2x}{{}^{2x}3y}+\dfrac{y^{\,y}}{6x^{\,y}}$

$LCD = 6xy$

$= \dfrac{4x^2}{6xy}+\dfrac{y^2}{6xy}$; $x \neq 0$, $y \neq 0$

$= \dfrac{4x^2+y^2}{6xy}$; $x \neq 0$, $y \neq 0$

Add and Subtract Rational Expressions With Monomial Denominators

a) $\dfrac{{}^{\times 2}\mathbf{1}}{{}^{\times 2}\mathbf{5x}}+\dfrac{\mathbf{1}^{\times 5}}{\mathbf{2x}^{\times 5}}$

$LCD = 10x$

1. factor denominators if possible
2. get a common denominator
3. re-write expression with a common denominator
4. add/subtract the numerator
(keep denominator the same)
5. simplify where possible
6. state restrictions (throughout process)

$= \dfrac{2}{10x}+\dfrac{5}{10x}$; $x \neq 0$

$= \dfrac{7}{10x}$; $x \neq 0$

b)

$$\frac{ab^2+2}{2ab^2}-\frac{b+2}{2b}\frac{(ab)}{(ab)}$$

$LCD = 2ab^2$

$$= \frac{ab^2+2}{2ab^2} - \frac{ab(b+2)}{2ab^2} \quad ; a\neq 0,\ b\neq 0$$

$$= \frac{ab^2+2}{2ab^2} - \frac{ab^2+2ab}{2ab^2} \quad ; a\neq 0,\ b\neq 0$$

$$= \frac{ab^2+2-ab^2-2ab}{2ab^2} \quad ; a\neq 0,\ b\neq 0$$

$$= \frac{2-2ab}{2ab^2} \quad ; a\neq 0,\ b\neq 0$$

$$= \frac{\cancel{2}(1-ab)}{\cancel{2}ab^2} \quad ; a\neq 0,\ b\neq 0$$

$$= \frac{1-ab}{ab^2} \quad ; a\neq 0,\ b\neq 0$$

Add and Subtract Rational Expressions with Polynomial Denominators

a)

$LCD: (x-3)(x+2)$

$$\frac{(x+2)}{(x+2)}\frac{x+5}{x-3}+\frac{x-7}{x+2}\frac{(x-3)}{(x-3)}$$

1. factor denominators if possible
2. get a common denominator
3. re-write expression with a common denominator
4. add/subtract the numerator
(keep denominator the same)
5. simplify where possible
6. state restrictions (throughout process)

$$= \frac{(x+2)(x+5)}{(x+2)(x-3)} + \frac{(x-7)(x-3)}{(x+2)(x-3)} \quad ; x \neq -2, 3$$

$$= \frac{x^2+7x+10}{(x+2)(x-3)} + \frac{x^2-10x+21}{(x+2)(x-3)} \quad ; x \neq -2, 3$$

$$= \frac{2x^2-3x+31}{(x+2)(x-3)} \quad ; x \neq -2, 3$$

b)

$$\frac{x+9}{x^2+2x-48}-\frac{x-9}{x^2-x-30}$$

LCD $=(x-6)(x+5)(x+8)$

$$=\frac{(x+5)}{(x+5)}\cdot\frac{x+9}{(x+8)(x-6)}-\frac{x-9}{(x-6)(x+5)}\cdot\frac{(x+8)}{(x+8)}$$

$$=\frac{(x+5)(x+9)}{(x+5)(x+8)(x-6)}-\frac{(x-9)(x+8)}{(x+5)(x+8)(x-6)}$$

$$=\frac{x^2+14x+45-(x^2-1x-72)}{(x+5)(x+8)(x-6)}$$

$$=\frac{15x+117}{(x+5)(x+8)(x-6)}\quad ;\ x\neq -5,-8,6$$

c)

$$\frac{x-2}{x+2}+\frac{x+10}{x^2+6x+8}$$

LCD $=(x+2)(x+4)$

$$=\frac{(x+4)}{(x+4)}\cdot\frac{x-2}{x+2}+\frac{x+10}{(x+2)(x+4)}$$

$$=\frac{(x+4)(x-2)}{(x+4)(x+2)}+\frac{x+10}{(x+4)(x+2)}$$

$$=\frac{x^2+2x-8+x+10}{(x+4)(x+2)}$$

$$=\frac{x^2+3x+2}{(x+4)(x+2)}$$ ← factor

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

$$=\frac{x+1}{x+4}\quad ;\ x\neq -4,-2$$

d)

$$\frac{2x}{x-1}-\frac{x+2}{x^2+3x-4}$$

$LCD = (x+4)(x-1)$

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

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

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

$$=\frac{2x^2+7x-2}{(x+4)(x-1)} \quad ; x \neq -4, 1$$

e)

$$\frac{a+1}{5-2a}-\frac{a-4}{2a-5}$$

Binomial expressions can differ by a factor of -1. Factor -1 from one of the denominators to identify the common denominator. Then simplify each expression and state the restrictions.

$$=\frac{a+1}{-1(-5+2a)}-\frac{a-4}{2a-5}$$

$$=\frac{(-1)}{(-1)}\frac{a+1}{-1(2a-5)}-\frac{a-4}{2a-5}$$

$$=\frac{-1(a+1)}{2a-5}-\frac{a-4}{2a-5}$$

$$=\frac{-1(a+1)-(a-4)}{2a-5}$$

$$=\frac{-a-1-a+4}{2a-5}$$

$$=\frac{-2a+3}{2a-5} \quad ; a \neq \frac{5}{2}$$