

Main Ideas/Questions	Notes/Examples Today: HW 3 and HW 4	
<p>DIVIDING Rational Expressions</p> $\frac{1}{2} \div \frac{3}{4}$ $\frac{1}{2} \times \frac{4}{3} = \frac{4}{6} = \frac{2}{3}$ <p><i>x by the reciprocal</i></p>	<p>To divide rational expressions, multiply by the _____!</p> <div style="display: flex; justify-content: space-between;"> <div data-bbox="448 526 949 884"> <p>Example 1: $\frac{12c^2d}{5a^2b^2} \times \frac{c^2d^2}{10ab}$</p> $\frac{12c^2d \cdot c^2d^2}{5a^2b^2 \cdot 10ab} = \frac{120abc^3d^3}{50a^3b^3}$ $= \frac{24}{5} \frac{abc^3d^3}{a^3b^3}$ </div> <div data-bbox="957 526 1460 884"> <p>Example 2: $\frac{(x^2+6x-27)(x-3)}{(x^2+11x+18)(x^2+x-2)}$</p> $\frac{(x+9)(x-3)(x-3)(x-3)}{(x+9)(x+2)(x+2)(x-1)(x-3)}$ $= \frac{(x-3)^2}{(x+2)^2(x-1)}$ </div> </div>	
<p>YOU TRY!</p>	<p>Find each quotient. Final answers must be written in simplest form.</p> <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 10px;"> <div data-bbox="448 929 949 1153"> <p>1. $\frac{x^3}{y^2} \div \frac{x^3}{y}$</p> </div> <div data-bbox="957 929 1460 1153"> <p>2. $\frac{4a^3}{bc^2} \div \frac{2a}{bc}$</p> </div> <div data-bbox="448 1153 949 1377"> <p>3. $\frac{6a^3}{4b^2} \div \frac{2a^2}{12b^2}$</p> </div> <div data-bbox="957 1153 1460 1377"> <p>4. $\frac{6x^2y}{3y} \div 2xy$</p> </div> <div data-bbox="448 1377 949 1601"> <p>5. $\frac{15x^2y^2}{3} \div 3xy$</p> </div> <div data-bbox="957 1377 1460 1601"> <p>6. $\left(\frac{2x^2}{3} \cdot \frac{6}{x}\right) \div \frac{8x^2}{25}$</p> </div> <div data-bbox="448 1601 949 1859"> <p>7. $\frac{(8z-16)(3z-6)}{20} \div \frac{(z-2) \cdot 40}{3(z-2)}$</p> $= \frac{8(z-2) \cdot 40}{20 \cdot 3(z-2)} = \frac{16}{3}$ </div> <div data-bbox="957 1601 1460 1859"> <p>8. $\frac{y^2-8y+7}{10y^2} \div \frac{y-7}{5y}$</p> </div> </div>	

<p>9. $\frac{b^2 - 81}{b} \div (b + 9)$</p>	<p>10. $\frac{6x^2 + x - 1}{2x + 1} \div \frac{(9x - 3)}{1}$</p> <p>$\frac{(3x-1)(2x+1)}{2x+1} \cdot \frac{1}{3(3x-1)}$</p> <p>$\frac{1}{3}$</p> <p>$\frac{3}{1} \cdot \frac{-1}{-2}$</p> <p>$\frac{3x-1}{6x^2-2x}$ $\frac{1}{3x-1}$</p>
<p>11. $\frac{9d^4}{d-3} \div \frac{d}{d-3}$</p>	<p>12. $\frac{6x^2 + 36x}{4x} \div \frac{4x + 24}{2x^2}$</p>
<p>13. $\frac{y^2 + 5y - 14}{9y} \div \frac{y^2 - 8y + 12}{3y}$</p>	<p>14. $\frac{x^2 - 2x - 15}{x - 2} \div \frac{x^2 - 10x + 25}{x - 2}$</p>

$$15. \frac{6x+6}{x-1} \div \frac{x^2+3x+2}{2x-2}$$

$$16. \frac{b+4}{b^2-6b-16} \div \frac{2b+8}{b-8}$$

$$17. \frac{9x^2+6x+1}{x+5} \div \frac{3x+1}{x^2+5x}$$

$$18. \frac{9x^3}{x^3-x} \div \frac{x-8}{x^2-9x+8}$$

Date: _____ Per: _____ Homework 3: Dividing Rational Expressions

**** This is a 2-page document! ******Directions:** Find each quotient. Final answers must be simplified.

1. $\frac{12ab}{a^2b^2} \div \frac{3b}{2a}$

2. $\frac{3xy^2}{8} \div 6xy$

3. $\frac{10c^2d}{3a^2b^2} \div \frac{5c^2d^2}{9ab}$

4. $\frac{2n-4}{2n} \div \frac{n^2-4}{n}$

5. $\frac{y^2-36}{y^2-49} \div \frac{y+6}{y-7}$

6. $\frac{m^2-1}{m^2-m} \div \frac{m^2-7m-8}{3m}$

7. $\frac{c^2+6c+8}{c^2+4c+4} \div \frac{c+4}{c+2}$

8. $\frac{k^2-5k+6}{5} \div \frac{k-3}{15}$

9. $\frac{n^2-5n+6}{8n^2+24n} \div \frac{n-2}{4n+12}$

$$10. \frac{p^2 - 2p + 1}{p + 1} \div \frac{p^2 - 1}{p + 1}$$

$$11. \frac{a^2 + 7a + 12}{a^2 + 3a - 10} \div \frac{a^2 - a - 20}{a^2 - 25}$$

$$12. \frac{w^2 - 9}{2w^2 + 13w - 7} \div \frac{2w^2 + 7w + 3}{4w^2 - 1}$$

$$13. \frac{y^2 + 5y - 14}{9y} \div \frac{y^2 - 8y + 12}{3y}$$

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

$$\frac{6(x+1) \cdot 2(x+1)}{(x-1)(x+1)(x+2)} = \frac{12}{x+2}$$

AC method for $6x^2 - 11x - 8$ and $2v^2 - 7v - 3$

24	2v-1
-8	-3
3r	6r^2-3r
-11	-4
8r	4

6	2v-1
-6	-1
-7	r
-3	2v^2-1v
-3	-6v
3	3

16. $\frac{(6r^2-11r+4)(r^2-25)}{(r^2-8r+15)(r+5)} \div (2r^2-7r+3)$

$$\frac{(2r-1)(3r-4)(r+5)(r-5)}{(r-3)(r-5)(r+5)}$$

$$\frac{(2r-1)(3r-4)}{(r-3)} \times \frac{1}{(r-3)(2r-1)} = \frac{(3r-4)}{(r-3)(r-3)}$$

15. $\frac{r^2+6r-27}{r^2+11r+18} \div \frac{r-3}{r^2+r-2}$

17. Write an expression in simplest form that makes the statement true:

d $\frac{k^2+2k-8}{k^2-8k+12} \div \boxed{?} = \frac{1}{k-4}$

ADDING & SUBTRACTING Rational Expressions

(*with LIKE BASES)

$$\frac{4}{7} + \frac{2}{7} = \frac{6}{7}$$

To add or subtract rational expression with a common denominator:

- 1 Combine the numerators and keep the common denominator.
- 2 Factor and simplify the remaining expression.

Example: $\frac{x^2 + 5x - 3x}{4x^2 + 5x - 6} - \frac{3x}{4x^2 + 5x - 6}$

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

like denominators. So just combine the top (numerators)

Find each sum or difference. Write each answer in simplest form.

YOU TRY!

1. $\frac{n}{8} + \frac{3n}{8} = \frac{4n}{8} = \left(\frac{n}{2}\right)$

2. $\frac{1}{3x} + \frac{5}{3x} = \frac{6}{3x} = \left(\frac{2}{x}\right)$

3. $\frac{7u}{16} - \frac{5u}{16} = \frac{2u}{16} = \left(\frac{u}{8}\right)$

4. $\frac{7p^2}{4p^3} - \frac{p^2}{4p^3} = \frac{6p}{4p^3} = \left(\frac{3}{2p}\right)$

5. $\frac{-8y^2}{3y} + \frac{11y^2}{3y}$

6. $\frac{7ab}{10a^2b} - \frac{3ab}{10a^2b}$

ADDING & SUBTRACTING Rational Expressions (*with LIKE BASES)	To add or subtract rational expression with a common denominator:	
	❶	Combine the numerators and keep the common denominator.
	❷	Factor and simplify the remaining expression.
	Example: $\frac{x^2 + 5x}{4x^2 + 5x - 6} - \frac{3x}{4x^2 + 5x - 6}$	
YOU TRY!	Find each sum or difference. Write each answer in simplest form.	
	1. $\frac{n}{8} + \frac{3n}{8}$	2. $\frac{1}{3x} + \frac{5}{3x}$
	3. $\frac{7u}{16} - \frac{5u}{16}$	4. $\frac{7p^2}{4p^3} - \frac{p^2}{4p^3}$
	5. $\frac{-8y^2}{3y} + \frac{11y^2}{3y}$	6. $\frac{7ab}{10a^2b} - \frac{3ab}{10a^2b}$
	7. $\frac{5x}{x+4} + \frac{20}{x+4}$	8. $\frac{w+9}{10} + \frac{w+7}{10}$

$\frac{w+9}{10} + \frac{w+7}{10} = \frac{(w+9) + (w+7)}{10} = \frac{2w+16}{10}$
 $\frac{2w+16}{10} = \frac{2(w+8)}{10} = \frac{(w+8)}{5}$

<p>9. $\frac{x-6}{2} - \frac{x-7}{2}$ $\left(\frac{1}{2}\right)$</p> <p>$\frac{x-6 - (x-7)}{2} = 1$</p>	<p>10. $\frac{g+2}{4} + \frac{g-8}{4}$ $\frac{(2g-6)}{4}$</p> <p>$\frac{g-3}{2}$ $\frac{2(g-3)}{4}$</p>
<p>11. $\frac{c^2}{c+2} - \frac{4}{c+2}$</p>	<p>12. $\frac{m+7}{8m+16} - \frac{m-1}{8m+16}$</p>
<p>13. $\frac{v}{v^2+5v-24} + \frac{8}{v^2+5v-24}$</p>	<p>14. $\frac{5k}{k^2+7k+12} + \frac{20}{k^2+7k+12}$</p>

15. $\frac{2r^2}{r^2 - 12r + 20} - \frac{4r}{r^2 - 12r + 20}$

$\frac{(2r^2 - 4r) - 2r(r-2)}{(r-10)(r-2)}$

~~$\frac{-10}{-12}$~~

$\frac{2r}{r-10}$

16. $\frac{4n}{3n^2 - n - 2} - \frac{n-2}{3n^2 - n - 2}$

$4n - (n-2)$

$3n+2$

$(3n^2 - n - 2)$

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

~~$\frac{-3}{-1}$~~
 $\frac{1}{n-1}$

$\begin{array}{r} 3n+2 \\ 3n^2+2n \\ \hline 3n-2 \end{array}$

17. $\frac{x^2+1}{x^2-4} + \frac{5x}{x^2-4} - \frac{2x+11}{x^2-4}$

18. $\frac{4d^2}{6d^3 - 42d^2} - \frac{28d}{6d^3 - 42d^2}$

19. $\frac{2g^2 - g}{4g^2 - 25} - \frac{15}{4g^2 - 25}$

$\frac{2g^2 - g - 15}{(2g+5)(g-5)}$

~~$\frac{-30}{-1}$~~

~~$\frac{2g-3}{2g^2-6g+5}$~~

$(2g+5)(g-3)$
 $(2g+5)(2g-5)$

20. $\frac{5w}{2w^2 + w - 1} - \frac{3w+1}{2w^2 + w - 1}$

Date: _____ Per: _____

Homework 4: Adding and Subtracting
Rational Expressions (Like Bases)**** This is a 2-page document! ******Find each sum or difference. Final answers must be simplified.**

1. $\frac{5n}{15} + \frac{7n}{15}$

2. $\frac{11a}{12a^2} - \frac{7a}{12a^2} = \frac{4a}{12a^2} = \frac{1}{3a}$

3. $\frac{10x^3y}{7xy^2} + \frac{4x^3y}{7xy^2}$

4. $\frac{9z}{3z-4} - \frac{12}{3z-4} = \frac{(9z-12)}{(3z-4)} = \frac{3(3z-4)}{3z-4} = 3$

5. $\frac{m+2}{2m-1} + \frac{3m-3}{2m-1}$

6. $\frac{a-4}{a+1} + \frac{a+6}{a+1} = \frac{(2a+2)}{a+1} = \frac{2(a+1)}{a+1} = 2$

7. $\frac{5a+2}{a^2} - \frac{4a+2}{a^2}$

<p>8. $\frac{k+4}{k^2-2k-3} + \frac{6k+3}{k^2-2k-3} = \frac{(7k+7)}{(k^2-2k-3)}$ $\begin{matrix} -3 \\ -2 \end{matrix}$</p> <p>$\frac{7}{k-3} = \frac{7(k+1)}{(k-3)(k+1)}$</p>	<p>9. $\frac{6x+3}{x^2+6x+5} - \frac{x-2}{x^2+6x+5}$</p>
<p>10. $\frac{6p+4}{4p^2+4p} + \frac{p+3}{4p^2+4p} = \frac{(7p+7)}{(4p^2+4p)}$</p> <p>$\frac{7}{4p} = \frac{7(p+1)}{4p(p+1)}$</p>	<p>11. $\frac{3x+2}{x^2-25} - \frac{2x-3}{x^2-25}$</p>

$$12. \frac{5y+3}{y^2-64} - \frac{(4y-5)}{y^2-64} = \frac{1y+8}{(y^2-64)} = \frac{y+8}{(y+8)(y-8)}$$

$$= \frac{1}{y-8}$$

$$13. \frac{m+6}{2m^2+4m-16} + \frac{m+2}{2m^2+4m-16}$$

$$14. \frac{3c}{c^2+3c-10} - \frac{6}{c^2+3c-10} = \frac{(3c-6)}{(c^2+3c-10)}$$

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

$$= \frac{3}{c+5}$$

$$15. \frac{4x}{3x^2-2x-5} + \frac{2x-10}{3x^2-2x-5}$$

16. $\frac{t^2}{t^2+3t-18} - \left(\frac{5t}{t^2+3t-18} - \frac{(t+3)}{t^2+3t-18} \right)$

typo

$$\frac{t^2}{t^2+3t-18} = \frac{(4t-3)}{t^2+3t-18}$$

$$\frac{(t^2-4t+3)}{(t^2+3t-18)}$$

3
-1
-4
-18
6
3

17. $\frac{3w^2+7w-7}{(w^2+8w+15)} - \left(\frac{2w^2-9w+4}{2w^2+9w-5} - \frac{(w^2-w-12)}{(w^2-w-12)} \right)$

order of operations

$$\frac{3w^2+7w-7}{(w+5)(w+3)} + \frac{1}{(w+5)(w+3)}$$

$$\frac{(3w^2+7w-6)}{(w+5)(w+3)} = \frac{(3w-2)(w+3)}{(w+5)(w+3)} = \frac{3w-2}{w+5}$$

-4	-12
3	-1
8	-1
-9	-1
2w-1	
w	2w ² -1w
-4	8w
4	
-10	-1
10	-1
9	-1
2w-1	
w	2w ² -1w
5	10w-5
-18	9
-2	9
7	
w+3	
3w	3w ² 9w
-2	2w-6

For questions 18-19. Write an expression in simplest form that makes each statement true.

18. $\frac{\boxed{?}}{12a^2+8a} + \frac{15a^2}{12a^2+8a} = \frac{7a}{3a+2}$

19. $\frac{p^2+7p+2}{p^2+5p-14} - \frac{\boxed{?}}{p^2+5p-14} = \frac{p-1}{p-2}$