

Answer Key

1.  $a^2 - 4$

$(a + 2)(a - 2)$

2.  $n^2 - 64$

$(n + 8)(n - 8)$

3.  $1 - 49d^2$

$(1 + 7d)(1 - 7d)$

4.  $-16 + p^2$

$(p + 4)(p - 4)$

5.  $k^2 + 25$

prime

6.  $36 - 100w^2$

$(6 - 10w)(6 + 10w)$

7.  $t^2 - 81u^2$

$(t + 9u)(t - 9u)$

8.  $4h^2 - 25g^2$

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

9.  $64m^2 - 9y^2$

$(8m - 3y)(8m + 3y)$

10.  $4c^2 - 5d^2$

prime

11.  $-49r^2 + 4t^2$

$(2t + 7r)(2t - 7r)$

12.  $8x^2 - 72p^2$

$8(x + 3p)(x - 3p)$

13.  $20q^2 - 5r^2$

$5(2q + r)(2q - r)$

14.  $32a^2 - 50b^2$

$2(4a + 5b)(4a - 5b)$

# T8-1 Review Key

Answers to Multiply and Divide Rational Expressions (ID: 1)

1)  $\frac{k+9}{k-8}$

5) 8

9)  $5b$

13)  $\frac{a+1}{a-5}$

17)  $\frac{3}{4}$

21)  $-\frac{7}{4}$

2)  $\frac{p-10}{4p}$

6)  $\frac{3}{r}$

10)  $\frac{7}{8}$

14)  $\frac{(k+3)(k-9)}{4}$

18)  $\frac{n}{3(n-1)}$

22)  $-\frac{12}{b+7}$

3)  $\frac{x+8}{10}$

7)  $\frac{16x^4}{x-4}$

11)  $x-9$

15)  $\frac{6p}{(p-4)(p+4)}$

19)  $\frac{x+5}{54x^3}$

23) 1

4)  $\frac{n+10}{10}$

8)  $\frac{3(n+5)}{10}$

12)  $\frac{3}{x-8}$

16)  $\frac{9}{x+9}$

20)  $\frac{1}{r-9}$

24)  $x^2 + 5x + 25$

# Review T8-2

Key

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

## Adding + Subtracting Rational Expressions

Simplify each expression.

$$1) \frac{u+5v}{8v^2u^2} - \frac{u-6v}{8v^2u^2}$$

$$\frac{11}{8vu^2}$$

$$2) \frac{5n}{30m} + \frac{2m+4n}{30m}$$

$$\frac{9n+2m}{30m}$$

$$3) \frac{a+2b}{6a^3} - \frac{5a+4b}{6a^3}$$

$$\frac{-2a-b}{3a^3}$$

$$4) \frac{x+y}{18xy} - \frac{6x+y}{18xy}$$

$$-\frac{5}{18y}$$

$$5) \frac{4a-5}{6a^2+30a} + \frac{a-1}{6a^2+30a}$$

$$\frac{5a-6}{6a^2+30a}$$

$$6) \frac{5x-4}{9x^3+27x^2} - \frac{x+6}{9x^3+27x^2}$$

$$\frac{4x-10}{9x^3+27x^2}$$

$$7) \frac{b-3}{12b+18} + \frac{4b}{12b+18}$$

$$\frac{5b-3}{12b+18}$$

$$8) \frac{n-4}{n^2-n-20} + \frac{n+1}{n^2-n-20}$$

$$\frac{2n-3}{n^2-n-20}$$

$$9) \frac{7x}{2x} - \frac{x-2}{20x+16}$$

$$\frac{69x+58}{4(5x+4)}$$

$$10) \frac{8}{7v-6} + \frac{4}{3v^2}$$

$$\frac{24v^2+28v-24}{3v^2(7v-6)}$$

$$11) \frac{7v}{8} - \frac{8v-4}{5v-2}$$

$$\frac{35v^2 - 78v + 32}{8(5v-2)}$$

$$12) \frac{4}{n+7} - \frac{7}{n-2}$$

$$\frac{-3n-57}{(n+7)(n-2)}$$

$$13) \frac{7}{3n^2+24n} - \frac{7}{2n}$$

$$\frac{-154-21n}{6n(n+8)}$$

$$14) \frac{6}{v-2} - \frac{7}{2v+7}$$

$$\frac{5v+56}{(2v+7)(v-2)}$$

$$15) \frac{6x}{3} + \frac{7}{15x+3}$$

$$\frac{30x^2+6x+7}{3(5x+1)}$$

$$16) \frac{5v}{v-3} + \frac{5}{v+6}$$

$$\frac{5v^2+35v-15}{(v+6)(v-3)}$$

$$17) \frac{4x}{x^2+4x-5} - \frac{5}{4}$$

$$\frac{-4x-5x^2+25}{4(x+5)(x-1)}$$

$$18) \frac{2}{x+3} - \frac{6x}{2x+1}$$

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

$$19) \frac{4x}{x+3} - \frac{4x}{x+6}$$

$$\frac{12x}{(x+3)(x+6)}$$

$$20) \frac{2x}{3x+3} - \frac{2}{x+5}$$

$$\frac{2x^2+4x-6}{3(x+1)(x+5)}$$

$$21) \frac{6}{x-2} + \frac{6}{x+1}$$

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

$$22) \frac{v-2}{3v^4-15v^3-18v^2} + 3v$$

$$\frac{9v^5-45v^4-54v^3+v-2}{3v^2(v+1)(v-6)}$$

# Review T8-3

# Key

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

## Solving Rational Equations

Solve each equation. Remember to check for extraneous solutions.

1)  $\frac{1}{6k^2} = \frac{1}{3k^2} - \frac{1}{k}$

$$\left\{ \frac{1}{6} \right\}$$

2)  $\frac{1}{n^2} + \frac{1}{n} = \frac{1}{2n^2}$

$$\left\{ -\frac{1}{2} \right\}$$

3)  $\frac{1}{6b^2} + \frac{1}{6b} = \frac{1}{b^2}$

$$\{5\}$$

4)  $\frac{b+6}{4b^2} + \frac{3}{2b^2} = \frac{b+4}{2b^2}$

$$\{4\}$$

5)  $\frac{1}{x} = \frac{6}{5x} + 1$

$$\left\{ -\frac{1}{5} \right\}$$

6)  $\frac{1}{6x^2} = \frac{1}{2x} + \frac{7}{6x^2}$

$$\{-2\}$$

7)  $\frac{1}{v} + \frac{3v+12}{v^2-5v} = \frac{7v-56}{v^2-5v}$

$$\{21\}$$

8)  $\frac{1}{m^2-m} + \frac{1}{m} = \frac{5}{m^2-m}$

$$\{5\}$$

9)  $\frac{1}{n-8} - 1 = \frac{7}{n-8}$

$$\{2\}$$

10)  $\frac{1}{r-2} + \frac{1}{r^2-7r+10} = \frac{6}{r-2}$

$$\left\{ \frac{26}{5} \right\}$$

$$11) 1 = \frac{v+2}{v-4} + \frac{7v-42}{v-4}$$

$$\left\{ \frac{36}{7} \right\}$$

$$12) \frac{r-4}{5r} = \frac{1}{5r} + 1$$

$$\left\{ -\frac{5}{4} \right\}$$

$$13) 1 + \frac{x^2 - 5x - 24}{3x} = \frac{x-6}{3x}$$

$$\{-3, 6\}$$

$$14) 1 = \frac{1}{x^2 + 2x} + \frac{x-1}{x}$$

$$\{-1\}$$

$$15) \frac{n+5}{n+8} = 1 + \frac{6}{n+1}$$

$$\left\{ -\frac{17}{3} \right\}$$

$$16) \frac{r+5}{r^2 - 2r} - 1 = \frac{1}{r^2 - 2r}$$

$$\{4, -1\}$$

$$17) \frac{1}{x^2 - 5x} = \frac{x+7}{x} - 1$$

$$\left\{ \frac{36}{7} \right\}$$

$$18) \frac{a-2}{a+3} - 1 = \frac{3}{a+2}$$

$$\left\{ -\frac{19}{8} \right\}$$

$$19) \frac{p+5}{p^2 + p} = \frac{1}{p^2 + p} - \frac{p-6}{p+1}$$

$$\{4, 1\}$$

$$20) \frac{5}{n^3 + 5n^2} = \frac{4}{n+5} + \frac{1}{n^2}$$

$$\left\{ -\frac{1}{4} \right\}$$

Perform the following operations and simplify the rational expressions.  
Note when the equation is undefined.

1.  $\frac{x(x-2)(x+1)}{x^2+3x-10}$

$$\frac{x(x+1)}{x+5}$$

$x \neq 2$   
 $x \neq 5$

2.  $\frac{2x^2+8x}{x^2+x-12}$

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

$x \neq -4$   
 $x \neq 3$

3.  $\frac{x^2-7x-8}{3x^2-6x} \div \frac{x^2-4x-32}{6x^2-12x}$

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

$x \neq 0, 2, 8, -4$

4.  $\frac{x^2-9}{\frac{x^2+5x+6}{\frac{x^2-7x+12}{x^2-2x-8}}}$

$$1$$

$x \neq -3, -2, 3, 4$

5.  $\frac{6x^5}{x^2-16} \cdot \frac{x+4}{3x^3}$

$$\frac{2x^2}{x-4}$$

$x = 0, 4, -4$

6.  $\frac{10x^2-50x}{4x^2-9} \cdot \frac{2x+3}{4x^2-20}$

no x here

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

$x \neq \frac{3}{2}, \pm\sqrt{5}$

if there was an x  
 $\frac{5}{2(2x-3)}$   $x \neq 1.5, -1.5, 0$   
 $x \neq 5$

$$1. \frac{20x^2}{3y} + \frac{7y}{36x^4y^2}$$

$$\frac{240x^6y + 7y}{36x^4y^2}$$

$$x \neq 0 \quad y \neq 0$$

$$2. \frac{15x^2y}{42x^2y} - \frac{5xy^3}{6xy^2}$$

$$\frac{15 - 35y}{42}$$

$$x, y \neq 0$$

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

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

$$x \neq 5$$

$$4. \frac{2}{x+2} - \frac{4x+5}{5x(x+2)}$$

$$\frac{6x-5}{5x(x+2)}$$

$$x \neq 0 \quad x \neq -2$$

$$5. \frac{5c}{12x^2yz} + \frac{2c}{38xy^3z}$$

$$\frac{95cy^2 + 12cxz}{228x^2y^3z}$$

$$x, y, z \neq 0$$

$$6. \frac{7x^2}{5z} - \frac{4zy}{42x^3z}$$

$$\frac{294x^5 - 20yz}{210x^3z}$$

$$x, z \neq 0$$



Solve. Note when undefined. ← undef only matters if our answer matches!

1.  $\frac{1}{5x^2 + 2x} - \frac{6}{5x + 2} = \frac{6}{5x^2 + 2x}$

$x = -5/6$  ✓

$5x^2 + 2x \neq 0$   
 $x(5x + 2) \neq 0$   
 $x \neq 0$   $x \neq -2/5$

2.  $\frac{3x + 15}{4x^2} = \frac{1}{x^2} - \frac{x - 3}{4x^2}$

$x = -2$

$x \neq 0$

3.  $\frac{x^2 - 4x - 12}{x^2 - 8x + 12} = \frac{6}{x - 5} + \frac{x - 3}{x - 5}$

$x = -1$

$x \neq 2, 6, 5$

4.  $\frac{4}{x^2 - 8x + 12} = \frac{x}{x - 2} + \frac{1}{x - 6}$

~~$x = 6$~~  or  $x = -1$

$x \neq 6, 2$   
 ↑

5.  $\frac{2x - 5}{x - 2} - 2 = \frac{3}{x + 2}$

$x = 1$  ✓

$x \neq 2, -2$

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

$x = -3$