Intermediate Algebra – Chapter 6
Lesson 1

Tell whether x and y show *direct variation, inverse variation,* or *neither.*

1. $\frac{xy}{x} = \frac{12}{x}$

$y = \frac{12}{x}$

Inverse

2. $4x = y$

direct

3. $x + y = 6$
$-x \quad -x$

$y = -x + 6$

neither

4. $\frac{xy}{x} = \frac{\frac{1}{2}}{x}$

$y = \frac{1}{2} \cdot \frac{1}{x}$

$y = \frac{1}{2x}$ inverse

5.

x	12	18	23	29	34
y	132	198	253	319	374

xy	1584	3564			
$\frac{y}{x}$	11	11	11	11	11

Direct

6.

x	4	5	6.2	7	11
y	16	11	10	9	6

xy	64	55			
$\frac{y}{x}$	4	$\frac{11}{5}$			

neither

7.

x	1.5	2.5	4	7.5	10
y	13.5	22.5	36	67.5	90

xy	20.25	56.25			
$\frac{y}{x}$	9	9	9	9	9

Direct

8.

x	4	6	8	8.4	12
y	21	14	10.5	10	7

xy	84	64			
y/x	7	$\frac{7}{3}$			

neither

Intermediate Algebra – Chapter 6

Lesson 1

The variables x and y vary inversely. Use the given values to write an equation relating x and y. Then find y when x = 3.

8. x = 1, y = 9

$y = \frac{a}{x}$

$9 = \frac{a}{1}$

$9 = a$

$\boxed{y = \frac{9}{x}}$

$y = \frac{9}{3}$

$\boxed{y = 3}$

9. x = 7, y = 2

$y = \frac{a}{x}$

$(7)2 = \frac{a}{7}(7)$

$14 = a$

$\boxed{y = \frac{14}{x}}$

$\boxed{y = \frac{14}{3}}$

10. x = -4, y = $-\frac{5}{4}$

$y = \frac{a}{x}$

$\left(\frac{-4}{1}\right)\frac{-5}{4} = \frac{a}{-4}(-4)$

$5 = a$

$\boxed{y = \frac{5}{x}}$

$\boxed{y = \frac{5}{3}}$

11. x = $\frac{5}{3}$, y = -7

$y = \frac{a}{x}$

$\left(\frac{5}{3}\right)\frac{-7}{1} = \frac{a}{5/3}(5/3)$

$-\frac{35}{3} = a$

$y = \frac{-\frac{35}{3}}{x}$

$y = -\frac{35}{3} \cdot \frac{1}{x} \Rightarrow \boxed{y = \frac{-35}{3x}}$

$y = \frac{-35}{3(3)}$

$\boxed{y = \frac{-35}{9}}$

12. The number y of songs that can be stored on an MP3 player varies inversely with the average size x of a song. A certain MP3 player can store 2500 songs when the average size of a song is 4 MB.

$y = \frac{a}{x} \rightarrow 2500(x) = \frac{4}{x}(x) \Rightarrow \frac{2500x}{2500} = \frac{4}{2500}$ $x = .0016$

a) Make a table showing the number of songs that will fit on the MP3 player when the average size of a song is 2 MB, 2.5 MB, 3 MB, and 5 MB.

a	2	2.5	3	5
y	1250	1562	1875	3125

$y = \frac{a}{.0016}$

b) What happens to the number of songs as the average song size increases?

number of songs also goes up

Intermediate Algebra – Chapter 6
Lesson 2, Day 1

Simplify the expression, if possible.

1. $\frac{7x^3-x^2}{2x^3}$

$\frac{x^2(7x-1)}{2x^3}$

$\boxed{\frac{7x-1}{2x}}$

2. $\frac{x^2+13x+36}{x^2-7x+10}$

$\boxed{\frac{(x+9)(x+4)}{(x-5)(x-4)}}$

3. $\frac{x^2-7x+12}{x^3-27}$

$\frac{(x-4)(x-3)}{(x-3)(x^2-3x+9)}$

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

4. $\frac{3x^3-3x^2+7x-7}{27x^4-147}$

$\frac{3x^2(x-1)+7(x-1)}{3(9x^4-49)} \Rightarrow \frac{(3x^2+7)(x-1)}{3(3x^2-7)(3x^2+7)}$

$\boxed{\frac{x-1}{3(3x^2-7)}}$

Find the product.

5. $\frac{48x^5y^3}{y^4} \cdot \frac{x^2y}{6x^3y^2}$

$\frac{8\cancel{48}x^{\cancel{5}4}\cancel{y^3}y}{\cancel{6}1\cancel{x^3}y^{\cancel{2}2}} \Rightarrow \boxed{\frac{8x^4}{y^2}}$

6. $\frac{x^3(x+5)}{x-9} \cdot \frac{(x-3)(x+6)}{x^3}$

$\frac{\cancel{x^3}(x+5)(x-3)(x+6)}{\cancel{x^3}(x-9)}$

$\boxed{\frac{(x+5)(x-3)(x+6)}{x-9}}$

7. $\frac{x^2-4x}{x-1} \cdot \frac{x^2+3x-4}{2x} \Rightarrow \frac{x(x-4)}{(x-1)} \cdot \frac{(x-3)(x-1)}{2x}$

$\Rightarrow \frac{\cancel{x}(x-4)(x-3)\cancel{(x-1)}}{2\cancel{x}\cancel{(x-1)}} = \frac{(x-4)(x-3)}{2}$

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

$\frac{\cancel{2}\cancel{x}(x-3)\cancel{(x+2)}(x+1)}{2\cancel{4}x^{\cancel{3}2}\cancel{(x+2)}(x+3)} \Rightarrow \boxed{\frac{(x-3)(x+1)}{2x^2(x+3)}}$

9. $\frac{x^2-x-12}{x^2-16} \cdot (x^2+2x-8)$

$$\frac{(x-4)(x+3)}{(x-4)(x+4)} \cdot \frac{(x+4)(x-2)}{1} \Rightarrow \frac{\cancel{(x-4)}(x+3)\cancel{(x+4)}(x-2)}{\cancel{(x-4)}\cancel{(x+4)}}$$

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

10. Describe and correct the error in simplifying the rational expression.

$$\frac{x^2+\overset{2}{\cancel{16}}x+\overset{3}{\cancel{48}}}{x^2+\underset{1}{\cancel{5}}x+\underset{1}{\cancel{16}}} = \frac{x^2+2x+3}{x^2+x+1}$$

Have to factor

11. Describe and correct the error in finding the product.

$$\frac{x^2-25}{3-x} \cdot \frac{x-3}{x+5} = \frac{(x+5)(x-5)}{3-x} \cdot \frac{x-3}{x+5}$$

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

$$= x-5, x \neq 3, x \neq -5$$

Cant cancel $x-3$ + $3-x$ w/o factoring out a -1

Intermediate Algebra – Chapter 6
Lesson 2, Day 2

Simplify the expression, if possible.

1. Which rational expression is in simplified form?

Ⓐ $\frac{x^2 - x - 6}{x^2 + 3x + 2}$

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

Ⓑ $\frac{x^2 + 6x + 8}{x^2 + 2x - 3}$

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

Ⓒ $\frac{x^2 - 6x + 9}{x^2 - 2x - 3}$

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

Ⓓ $\frac{x^2 + 3x - 4}{x^2 + x - 2}$

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

Find the quotient.

2. $\frac{2xyz}{x^3z^3} \div \frac{6y^4}{2x^2z^2}$

$\frac{2xyz}{x^3z^3} \cdot \frac{2x^2z^2}{6y^4} \Rightarrow \frac{\cancel{4}^{2}\cancel{x^3}\cancel{y}\cancel{z^3}}{\cancel{6}_{3}\cancel{x^3}\cancel{y^4}\cancel{z^3}}$

$\boxed{\frac{2}{3y^3}}$

3. $\frac{2x^2-12x}{x^2-7x+6} \div \frac{2x}{3x-3}$

$\frac{2x(x-6)}{(x-6)(x-1)} \cdot \frac{3(x-1)}{2x}$

$\frac{\cancel{3}\cancel{6x}\cancel{(x-6)}\cancel{(x-1)}}{\cancel{2x}\cancel{(x-6)}\cancel{(x-1)}} = \boxed{3}$

4. $\frac{x^2-5x-36}{x+2} \div (x^2 - 6x + 9)$

$\frac{(x-9)(x+4)}{x+2} \cdot \frac{1}{(x-3)(x-3)}$

$\frac{(x-9)(x+4)}{(x+2)(x-3)(x-3)}$

5. $\frac{x^2-3x-40}{x^2+8x-20} \div \frac{x^2+13x+40}{x^2+12x+20}$

$\frac{(x-8)(x+5)}{(x+10)(x-2)} \cdot \frac{(x+10)(x+2)}{(x+8)(x+5)}$

$\frac{(x-8)\cancel{(x+5)}\cancel{(x+10)}(x+2)}{\cancel{(x+10)}(x-2)(x+8)\cancel{(x+5)}}$

$\frac{(x-8)(x+2)}{(x-2)(x+8)}$

Intermdediate Algebra – Chapter 6
Lesson 3, Day 1

Find the sum or difference.

1. $\frac{x}{16x^2} - \frac{4}{16x^2}$

$\boxed{\frac{x-4}{16x^2}}$

2. $\frac{4x^2}{2x-1} - \frac{1}{2x-1}$

$\frac{4x^2-1}{2x-1} \Rightarrow \frac{\cancel{(2x-1)}(2x+1)}{\cancel{2x-1}}$

$\boxed{2x+1}$

Find the least common multiple of the expressions.

3. $2x^2$; $4x + 12$

$2x^2 \rightarrow 2x^2$

$4x+12 \rightarrow 4(x+3)$

LCM: $4x^2(x+3)$

4. $24x^2$; $8x^2 - 16x$

$24x^2 \rightarrow 24x^2$

$8x^2-16x \rightarrow 8x(x-2)$

LCM: $24x^2(x-2)$

5. $9x^2 - 16$; $3x^2 + x - 4$

$9x^2-16 \rightarrow (3x-4)(3x+4)$

$3x^2+x-4 \rightarrow (3x+4)(x-1)$

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

6. $x^2 - 2x - 63$; $x + 7$

$x^2-2x-63 \rightarrow (x-9)(x+7)$

$x+7 \rightarrow (x+7)$

$(x-9)(x+7)$

Find the sum or difference.

7. $\frac{8}{3x^2} + \frac{5}{4x}$ LCD: $12x^2$

$\frac{8(4)}{3x^2(4)} + \frac{5(3x)}{4x(3x)}$

$\frac{32}{12x^2} + \frac{15x}{12x^2}$

$\boxed{\frac{32+15x}{12x^2}}$

8. $\frac{9}{x-3} + \frac{2x}{x+1}$ LCD: $(x-3)(x+1)$

$\frac{9(x+1)}{(x-3)(x+1)} + \frac{2x(x-3)}{(x+1)(x-3)}$

$\frac{9x+9}{(x-3)(x+1)} + \frac{2x^2-6x}{(x+1)(x-3)}$

$\frac{2x^2+3x+9}{(x-3)(x+1)}$

Intermdediate Algebra – Chapter 6

Lesson 3, Day 1

9. $\frac{x^2-5}{x^2+5x-14} - \frac{x+3}{x+7}$ LCD: $(x+7)(x-2)$

$x^2+5x-14 \rightarrow (x+7)(x-2)$

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

$\frac{x^2-5}{(x+7)(x-2)} - \frac{x^2+3x-2x-6}{(x+7)(x-2)} \Rightarrow \frac{x^2-5}{(x+7)(x-2)} - \frac{x^2+x-6}{(x+7)(x-2)}$

$\frac{x^2-5-x^2-x+6}{(x+7)(x-2)} \Rightarrow \boxed{\frac{-x+1}{(x+7)(x-2)}}$

10. $\frac{x+3}{x^2-25} - \frac{x-1}{x-5} + \frac{3}{x+3}$ LCD: $(x-5)(x+5)(x+3)$

$x^2-25 \rightarrow (x+5)(x-5)$

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

$\frac{x^2+3x+3x+9}{} - \frac{(x-1)(x^2+5x+3x+15)}{} + \frac{3(x^2+5x-5x-25)}{}$

$\frac{x^2+6x+9}{} - \frac{(x-1)(x^2+8x+15)}{} + \frac{3(x^2-25)}{}$

$\frac{x^2+6x+9}{} - \frac{(x^3+8x^2+15x-x^2-8x-15)}{} + \frac{3x^2-75}{}$

Tell whether the statement is *always*, *sometimes*, or *never* true. Explain your reasoning.

11. The LCD of two rational expressions is the product of the denominators.

Sometimes

$2x+4 \rightarrow 4x$ $\quad$ $3x+4 \rightarrow 12x$

$2x(4) \rightarrow 8x$ $\quad$ $3x(4) \rightarrow 12x$

12. The LCD of two rational expressions will have a degree greater than or equal to that of the denominator with the higher degree.

Always, cannot be lower degree

$\frac{x^2+6x+9}{} - \frac{x^3+7x^2+7x-15}{} + \frac{3x^2-75}{}$

$\frac{\cancel{x^2}+\cancel{6x}+\cancel{9}-\cancel{x^3}-\cancel{7x^2}-\cancel{7x}+15+\cancel{3x^2}-\cancel{75}}{(x+5)(x-5)(x+3)} \Rightarrow \boxed{\frac{-x^3-3x^2-x-66}{(x+5)(x-5)(x+3)}}$

Intermediate Algebra – Chapter 6
Lesson 4

Solve the equation by cross multiplying. Check your solution(s).

1. $\frac{9}{3x} = \frac{4}{x+2}$

$9(x+2) = 3x(4)$

$9x + 18 = 12x$

$-9x \quad -9x$

$\frac{18}{3} = \frac{3x}{3}$

$\boxed{6 = x}$

2. $\frac{8}{3x-2} = \frac{2}{x-1}$

$8(x-1) = 3x-2(2)$

$8x - 8 = 6x - 4$

$-6x \quad -6x$

$2x - 8 = -4$

$+8 \quad +8$

$\frac{2x}{2} = \frac{4}{2}$ $\boxed{x = 2}$

3. $\frac{-2}{x-1} = \frac{x-8}{x+1}$

$-2(x+1) = x-1(x-8)$

$-2x - 2 = (x^2 - 8x - x + 8)$

$-2x - 2 = (x^2 - 9x + 8)$

$-x^2 + 9x - 8 - 2x - 2$

$-x^2 + 7x - 10$

$x + 5 = 0$ $\quad -x + 2 = 0$

$\boxed{x = -5}$ $\boxed{x = 2}$ $\quad \frac{-x}{-1} = \frac{-2}{-1}$

4. $\frac{-1}{x-3} = \frac{x-4}{x^2-27}$

$-1(x^2-27) = (x-3)(x-4)$

$-x^2 + 27 = x^2 - 4x - 3x + 12$

$-x^2 + 7x - 12 \quad -x^2 + 4x + 3x - 12$

$-2x^2 + 7x + 15 = 0$

$2x^2 - 7x - 15 = 0$

$(2x+3)(x-5) = 0$

$2x + 3 = 0 \quad x - 5 = 0$

$\boxed{x = -\frac{3}{2}}$ $\boxed{x = 5}$

5. So far in volleyball practice, you have put into play 37 of the 44 serves you have attempted. Solve the equation $\frac{90}{100} = \frac{37+x}{44+x}$ to find the number of consecutive serves you need ot put into play in order to raise your serve percentage to 90%.

$90(44+x) = 100(37+x)$

$3960 + 90x = 3700 + 100x$

$-3960 - 100x \quad -3960 - 100x$

$\frac{-10x}{-10} = \frac{-260}{-10}$

$\boxed{x = 26}$

Intermediate Algebra – Chapter 6

Lesson 4

Identify the least common denominator of the equation.

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

LCD: $3x(x+3)$

7. $\frac{4}{x+9} + \frac{3x}{2x-1} = \frac{10}{3}$

LCD: $3(2x-1)(x+9)$

Solve the equation using the LCD. Check your solution(s).

8. $\frac{2}{3x} + \frac{1}{6} = \frac{4}{3x}$ LCD: $6x$

$\frac{2}{\cancel{3x}}[\cancel{6x}^{2}] + \frac{1}{\cancel{6}}[\cancel{6}x] = \frac{4}{\cancel{3x}}[\cancel{6x}^{2}]$

$4 + x = 8$

$-4 \quad -4$

$\boxed{x = 4}$

9. $\frac{2}{x-3} + \frac{1}{x} = \frac{x-1}{x-3}$ LCD: $x(x-3)$

$\frac{2}{\cancel{x-3}}[x\cancel{(x-3)}] + \frac{1}{\cancel{x}}[\cancel{x}(x-3)] = \frac{x-1}{\cancel{x-3}}[x\cancel{(x-3)}]$

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

$3x - 3 = x^2 - x$

$-x^2 + x \quad -x^2 + x$

$-x^2 + 4x - 3 = 0$

$x^2 - 4x + 3 = 0$

$(x-3)(x-1) = 0$

$x - 3 = 0 \qquad x - 1 = 0$

$\boxed{\cancel{x = 3}} \qquad \boxed{x = 1}$

10. $\frac{10}{x} + 3 = \frac{x+9}{x-4}$ LCD: $x(x-4)$

$\frac{10}{\cancel{x}}[\cancel{x}(x-4)] + 3[x(x-4)] = \frac{x+9}{\cancel{x-4}}[x\cancel{(x-4)}]$

$10(x-4) + 3x(x-4) = x(x+9)$

$10x - 40 + 3x^2 - 12x = x^2 + 9x$

$3x^2 - 2x - 40 = x^2 + 9x$

$-x^2 - 9x \quad -x^2 - 9x$

$2x^2 - 11x - 40 = 0$

$(2x+5)(x-8) = 0$

$2x + 5 = 0 \qquad x - 8 = 0$

$-5 \quad -5 \qquad \boxed{x = 8}$

$2x = -5$

$\boxed{x = -\frac{5}{2}}$

11. $\frac{10}{\cancel{x^2-2x}} + \frac{4}{x} = \frac{5}{x-2}$ LCD: $x(x-2)$

$x(x-2)$

$\frac{10}{\cancel{x(x-2)}}[\cancel{x(x-2)}] + \frac{4}{\cancel{x}}[\cancel{x}(x-2)] = \frac{5}{\cancel{x-2}}[x\cancel{(x-2)}]$

$10 + 4(x-2) = 5x$

$10 + 4x - 8 = 5x$

$4x + 2 = 5x$

$-4x \quad -4x$

$\boxed{\cancel{2 = x}}$

The functions below all have inverses. Find the inverse of the function.

12. $f(x) = \frac{7}{x+6}$

$$y = \frac{7}{x+6}$$
$$(y+6)x = \frac{7}{y+6}(y+6)$$
$$\frac{x(y+6)}{x} = \frac{7}{x}$$
$$y+6 = \frac{7}{x} - 6$$
$$-6$$
$$\boxed{y = \frac{7}{x} - 6}$$

13. $f(x) = \frac{5}{x} - 6$

$$y = \frac{5}{x} - 6$$
$$x = \frac{5}{y} - 6$$
$$-6 \quad -6$$
$$(y)x - 6 = \frac{5}{y}(y)$$
$$\frac{y(x-6)}{x-6} = \frac{5}{x-6}$$
$$\boxed{y = \frac{5}{x-6}}$$

14. $f(x) = \frac{8}{9+5x}$

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

15. $f(x) = \frac{1}{x^4} - 7$

$$y = \frac{1}{x^4} - 7$$
$$x = \frac{1}{y^4} - 7$$
$$+7 \quad +7$$
$$(y^4)x + 7 = \frac{1}{y^4}(y^4)$$
$$\frac{y^4(x+7)}{x+7} = \frac{1}{x+7}$$
$$\sqrt[4]{y^4} = \sqrt[4]{\frac{1}{x+7}}$$
$$y = \pm\sqrt[4]{\frac{1}{x+7}}$$

Intermediate Algebra – Chapter 7

Lesson 1

Name Key

Find the indicated nth root(s) of a.

1. n = 3, a = 8

$x^3 = 8$

$x = 2$

2. N = 5, a = -1

$x^5 = -1$

$x = -1$

3. n = 4, a = 256

$x^4 = 256$

$x = \pm 4$

4. N = 6, a = -729

$x^6 = -729$

No sol

6th power (even) can't be −

Evaluate the expression without using a calculator.

5. $8^{1/3}$

2

6. $81^{3/4}$

$(81^{1/4})^3$

$(3)^3$

27

7. $(-64)^{4/3}$

$(-64^{1/3})^4$

$(-4)^4$

256

8. $16^{-7/4}$

$\frac{1}{16^{7/4}} \rightarrow \frac{1}{(16^{1/4})^7}$

$\frac{1}{2^7} = \frac{1}{128}$

Describe and correct the error in evaluating the expression.

9. $27^{2/3} = (27^{1/3})^2 = 9^2 = 81$

cubed root of 27 = 3

$(27^{1/3})^2 = (3)^2 = 9$

10. $256^{3/4} = (\sqrt[4]{256})^3 = 4^3 = 64$

$\sqrt[3]{256^4} \Rightarrow$

1625.499

Intermediate Algebra – Chapter 7

Lesson 1

Match the equivalent expressions. Explain your reasoning.

11. $(\sqrt[3]{5})^4$

12. $(\sqrt[4]{5})^3$

13. $\frac{1}{\sqrt[4]{5}}$

14. $-\sqrt[4]{5}$

A. $5^{-1/4}$

B. $5^{4/3}$

C. $-5^{1/4}$

D. $5^{3/4}$

Evaluate the expression using a calculator. Round your answer to two decimal places when appropriate.

15. $\sqrt[7]{1695}$

2.89

16. $85^{1/6}$

2.10

17. $25^{-1/3}$

.34

18. $20736^{4/5}$

2840.46

19. $(\sqrt[4]{187})^3$

$187^{3/4}$

50.57

20. $(\sqrt[5]{-8})^8$

$(-8)^{8/5}$

27.86

Intermediate Algebra – Chapter 7

Lesson 2, Day 1

Name _____

Use the properties of rational exponents to simplify the expression.

1. $(12^2)^{1/4}$

$12^{2/4}$

$12^{1/2}$

2. $\frac{7}{7^{1/3}}$

$7^{1-\frac{1}{3}} = 7^{2/3}$

3. $\left(\frac{9^3}{6^3}\right)^{-1/3}$

$\left(\frac{6^3}{9^3}\right)^{1/3} \Rightarrow \frac{6}{9} = \frac{2}{3}$

4. $(5^{1/2} \cdot 5^{-3/2})^{-1/4}$

$\boxed{5^{\frac{1}{2}+(-\frac{3}{2})}}^{-1/4}$

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

5. $\frac{2^{2/3} \cdot 16^{2/3}}{4^{2/3}}$

$\frac{32^{2/3}}{4^{2/3}} = 8^{2/3}$

$(8^{1/3})^2 = (2)^2 = 4$

6. $\frac{49^{3/8} \cdot 49^{7/8}}{7^{5/4}}$

$\frac{49^{\frac{3}{8}+\frac{7}{8}}}{7^{5/4}} \Rightarrow \frac{49^{14/8}}{7^{5/4}} = \frac{49^{\frac{5}{4}}}{7^{5/4}}$

$\boxed{7^{5/4}}$

Use the properties of radicals to simplify the expression.

7. $\sqrt[3]{16} \cdot \sqrt[3]{32}$

$\sqrt[3]{512}$

8

8. $\sqrt[4]{8} \cdot \sqrt[4]{8}$

$\sqrt[4]{64}$

$\sqrt[4]{16}\sqrt[4]{4}$

$2\sqrt[4]{4}$

9. $\frac{\sqrt{2}}{\sqrt{32}}\frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{4}}{\sqrt{64}} = \frac{2}{8} = \frac{1}{4}$

Intermediate Algebra – Chapter 7

Lesson 2, Day 1

Write the expression in simplest form.

10. $\sqrt[4]{567}$

$\sqrt[4]{81}\sqrt[4]{7}$

$3\sqrt[4]{7}$

11. $\frac{\sqrt[4]{4}}{\sqrt[4]{27}}\frac{\sqrt[4]{3}}{\sqrt[4]{3}}$

$\frac{\sqrt[4]{12}}{\sqrt[4]{81}} = \frac{\sqrt[4]{12}}{3}$

12. $\sqrt{\frac{3}{8}}$ $\frac{\sqrt{3}\sqrt{2}}{\sqrt{8}\sqrt{2}} = \frac{\sqrt{6}}{\sqrt{16}}$

$\frac{\sqrt{6}}{4}$

13. $\sqrt[3]{\frac{7}{4}}$ $\frac{\sqrt[3]{7}}{\sqrt[3]{4}}\frac{\sqrt[3]{2}}{\sqrt[3]{2}}$

$\frac{\sqrt[3]{14}}{\sqrt[3]{8}} = \frac{\sqrt[3]{14}}{2}$

14. $\sqrt[3]{\frac{64}{49}}$ $\frac{\sqrt[3]{64}}{\sqrt[3]{49}} = \frac{4}{\sqrt[3]{49}}\frac{\sqrt[3]{7}}{\sqrt[3]{7}}$

$\frac{4\sqrt[3]{7}}{\sqrt[3]{343}}$

$\frac{4\sqrt[3]{7}}{7}$

15. $\sqrt[4]{\frac{1296}{25}}$ $\frac{\sqrt[4]{1296}}{\sqrt[4]{25}}$

$\frac{6}{\sqrt[4]{25}}\frac{\sqrt[4]{25}}{\sqrt[4]{25}}$

$\frac{6\sqrt[4]{25}}{\sqrt[4]{625}}$

$\frac{6\sqrt[4]{25}}{5}$

Intermediate Algebra – Chapter 7
Lesson 2, Day 2
Name _____

Simplify the expression.

1. $8\sqrt[6]{5} - 12\sqrt[6]{5}$

$4\sqrt[6]{5}$

2. $13(8^{3/4}) - 4(8^{3/4})$

$9(8^{3/4})$

2. $7\sqrt[3]{2} - \sqrt[3]{128}$

$7\sqrt[3]{2} - \sqrt[3]{64}\sqrt[3]{2}$

$7\sqrt[3]{2} - 4\sqrt[3]{2}$

$3\sqrt[3]{2}$

4. $(5^{1/4}) + 6(405^{1/4})$

$5^{1/4} + 6(81^{1/4})(5^{1/4})$

$(5^{1/4}) + 6(3)(5^{1/4})$

$(5^{1/4}) + 18(5^{1/4})$

$19(5^{1/4})$

Simplify the expression.

5. $\sqrt[3]{64r^3t^6}$

$4rt^2$

6. $\sqrt[4]{\frac{r^{16}}{16s^6}}$

$\frac{r^4\sqrt[4]{s^2}}{2s\sqrt[4]{s^2}\sqrt[4]{s^2}} \Rightarrow \frac{r^4\sqrt[4]{s^2}}{2s^2}$

7. $\sqrt[6]{\frac{g^6h}{h^7}}$ $\frac{g\sqrt[6]{h}}{h\sqrt[6]{h}}$

$\frac{g}{h}$

8. $\sqrt[8]{\frac{r^{18}p^7}{r^3p^{-1}}}$

$\sqrt[8]{r^{15}p^8}$

$rp\sqrt[8]{r^7}$

Intermediate Algebra – Chapter 7

Lesson 2, Day 2

Write the expression in simplest form. Assume all variables are positive.

9. $\sqrt{81a^7b^{12}c^9}$

$9a^3b^6c^4\sqrt{ac}$

10. $\sqrt[4]{\frac{405x^3y^3}{5x^{-1}y}}$

$\sqrt[4]{81x^4y^2}$

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

11. $\frac{\sqrt[4]{v^6}}{\sqrt[7]{v^5}}$ $\sqrt[7]{v^2}$ $\sqrt[7]{v^3}$

$\frac{\cancel{v}\sqrt[4]{v^2}\sqrt[7]{v^2}}{\cancel{v}}$

$\sqrt[4]{v^2}\sqrt[7]{v^2}$

Perform the indicated operation. Assume all variables are positive.

12. $11\sqrt{2z} - 5\sqrt{2z}$

$6\sqrt{2z}$

13. $7\sqrt[3]{m^7} + 3m^{7/3}$

$7m^{7/3} + 3m^{7/3}$

$10m^{7/3}$

14. $(p^{1/2} \cdot p^{1/4}) - \sqrt[4]{16p^3}$

$p^{\frac{2}{4}} - 2p^{\frac{3}{4}}$

$-p^{\frac{3}{4}}$

Intermediate Algebra – Chapter 7
Lesson 3, Day 1
Name _____

Solve the equation. Check your solution.

1. $(\sqrt{5x+1})^2 = (6)^2$

$5x+1 = 36$
$-1 \quad -1$
$\frac{5x}{5} = \frac{35}{5}$
$\boxed{x=7}$

2. $\sqrt[3]{x} - 10 = 7$

$+10 \quad +10$
$(\sqrt[3]{x})^3 = (17)^3$
$x = 4913$

3. $8\sqrt[3]{10x} - 15 = 17$

$+15 \quad +15$
$\frac{8\sqrt[3]{10x}}{8} = \frac{32}{8}$
$(\sqrt[3]{10x})^3 = (4)^3$
$\frac{10x}{10} = \frac{64}{10}$
$x = \frac{64}{10}$ or $\frac{32}{5}$

4. $\sqrt{2x} - \frac{2}{3} = 0$

$+\frac{2}{3} \quad +\frac{2}{3}$
$(\sqrt{2x})^2 = (\frac{2}{3})^2$
$\frac{2x}{2} = \frac{\frac{4}{9}}{2}$
$x = \frac{4}{9} \cdot \frac{1}{2} = \frac{2}{9}$

5. $(x-10)^2 = (\sqrt{9x})^2$

$(x-10)(x-10) = 9x$
$x^2 - 10x - 10x + 100 = 9x$
$x^2 - 20x + 100 = 9x$
$-9x \quad -9x$
$x^2 - 29x + 100 = 0$
$(x-25)(x-4) = 0$

$x-25=0 \quad x-4=0$
$\boxed{x=25} \quad \boxed{x=4}$

6. $(\sqrt{2x+30})^2 = (x+3)^2$

$2x+30 = (x+3)(x+3)$
$2x+30 = x^2+3x+3x+9$
$2x+30 = x^2+6x+9$
$-x^2-6x-9 \quad -x^2-6x-9$
$-x^2-4x+21=0$
$x^2+4x-21=0$
$(x+7)(x-3)=0$
$x+7=0 \quad x-3=0$
$\boxed{x=-7} \quad \boxed{x=3}$

7. $(\sqrt[4]{3 - 8x^2})^4 = (2x)^4$

$3 - 8x^2 = 16x^4$
$-16x^4 \quad -16x^4$
$-16x^4 - 8x^2 + 3 = 0$
$16x^4 - 8x^2 + 3 = 0$
$(4x^2+1)(4x^2-3) = 0$
$4x^2+1=0 \quad 4x^2-3=0$
$-1 \quad -1$
$\frac{4x^2}{4} = \frac{-1}{4} \quad \frac{4x^2}{4} = \frac{3}{4}$
$x^2 = \frac{1}{4} \quad x^2 = \frac{3}{4}$
$x = \pm\frac{1}{4}i \quad x = \pm\frac{\sqrt{3}}{2}$

8. $(\sqrt[3]{x+5})^3 = (2\sqrt[3]{2x+6})^3$

$x+5 = 8(2x+6)$
$x+5 = 16x+48$
$-16x-5 \quad -16x-5$
$\frac{-15x}{-15} = \frac{43}{-15}$
$x = \frac{43}{-15}$

Intermediate Algebra – Chapter 7
Lesson 3, Day 2
Name _____

Solve the equation. Check your solution.

1. $\frac{2x^{2/3}}{2} = \frac{8}{2}$

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

$x = (4^{1/2})^3$

$x = 2^3$

$x = 8$

2. $\frac{4x^{3/2}}{4} = \frac{32}{4}$

$(x^{\frac{3}{2}})^{\frac{2}{3}} = (8)^{\frac{2}{3}}$

$x = (8^{\frac{1}{3}})^2$

$x = 2^2$

$x = 4$

3. $2x^{3/4} - 14 = 40$

$+14 \quad +14$

$\frac{2x^{\frac{3}{4}}}{2} = \frac{54}{2}$

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

$x = (27^{1/3})^4$

$x = 3^4$

$x = 81$

4. $(5 - x)^{1/2} - 2x = 0$

$+2x \quad +2x$

$((5-x)^{1/2})^2 = (2x)^2$

$5 - x = 4x^2$

$-4x^2 \quad -4x^2$

$-4x^2 - x + 5 = 0$

$4x^2 + x - 5 = 0$

$(4x+5)(x-1) = 0$

$4x + 5 = 0 \quad x - 1 = 0$

$\frac{4x}{4} = \frac{-5}{4} \quad \boxed{x = 1}$

$\boxed{x = \frac{-5}{4}}$

5. $(5x^2 - 4)^{1/4} = (x)^4$

$5x^2 - 4 = x^4$

$-x^4 \quad -x^4$

$-x^4 + 5x^2 - 4 = 0$

$x^4 - 5x^2 + 4 = 0$

$(x^2 - 4)(x^2 - 1) = 0$

$(x-2)(x+2)(x-1)(x+1) = 0$

$x - 2 = 0 \quad x + 2 = 0 \quad x - 1 = 0 \quad x + 1 = 0$

$x = 2 \quad x = -2 \quad x = 1 \quad x = -1$

Intermediate Algebra – Chapter 7
Lesson 3, Day 2

Solve the Inequality.

7. $\left(\sqrt[3]{x-4}\right)^3 \le (5)^3$

$x-4 \le 125$
$+4 \quad +4$

$x \le 129$

8. $7\sqrt{x}+1<9$
$-1 \quad -1$

$\frac{7\sqrt{x}}{7} < \frac{8}{7}$

$(\sqrt{x})^2 < \left(\frac{8}{7}\right)^2$

$x < \frac{64}{49}$

9. $\left(\sqrt[3]{x+7}\right)^3 \ge (3)^3$

$x+7 \ge 27$
$-7 \quad -7$

$x \ge 20$

10. $-2\sqrt[3]{x+4} < 12$
$-2 \quad -2$

$\left(\sqrt[3]{x+4}\right)^3 > (-6)^3$

$x+4 > 216$
$-4 \quad -4$

$x > 212$

Solve the nonlinear system.

11. $y^2 = x - 3$
$y = x - 3$

$(x-3)^2 = x-3$

$(x-3)(x-3) = x-3$

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

$x^2-6x+9 = x-3$
$-x \quad +3 \quad -x \quad +3$

$x^2-7x+12=0$

$(x-4)(x-3)=0$

$x-4=0 \quad x-3=0$

$\boxed{x=4} \quad \boxed{x=3}$

12. $y^2 = 2x + 17$
$y = x + 5$

$(x+5)^2 = 2x+17$

$(x+5)(x+5) = 2x+17$

$x^2+5x+5x+25 = 2x+17$
$-2x \quad -17 \quad -2x \quad -17$

$x^2+8x+8=0$

$a=1 \quad b=8 \quad c=8$

$\frac{-8\pm\sqrt{8^2-4(1)(8)}}{2(1)} \Rightarrow \frac{-8\pm\sqrt{64-32}}{2}$

$\frac{-8\pm\sqrt{32}}{2} \Rightarrow \frac{-8\pm\sqrt{16\sqrt{2}}}{2} \Rightarrow \frac{-8\pm4\sqrt{2}}{2}$

$\Rightarrow \boxed{-4\pm2\sqrt{2}}$

Intermediate Algebra – Chapter 7
Lesson 4, Day 1

Write in terms of i.

1. $\sqrt{-4}$

$2i$

2. $\sqrt{-49}$

$7i$

3. $\sqrt{-\frac{1}{16}}$

$\frac{1}{4}i$

4. $\sqrt{-\frac{9}{64}}$

$\frac{3}{8}i$

5. $\sqrt{-3}$

$i\sqrt{3}$

6. $\sqrt{-10}$

$i\sqrt{10}$

7. $\sqrt{-18}$

$i\sqrt{9}\sqrt{2}$

$3i\sqrt{2}$

8. $-\sqrt{-9}$

$-3i$

9. $3\sqrt{-\frac{7}{36}}$

$3i\frac{\sqrt{7}}{6}$

10. $-\frac{1}{4}\sqrt{-12}$

$-\frac{1}{4}i\sqrt{4}\sqrt{3}$

$-\frac{1}{4}i(2)\sqrt{3}$

$-\frac{1}{2}i\sqrt{3}$

11. $-\frac{1}{2}\sqrt{-32}$

$-\frac{1}{2}i\sqrt{16}\sqrt{2}$

$-\frac{1}{2}i(4)\sqrt{2}$

$-2i\sqrt{2}$

Perform the indicated operation.

12. (1 + 12i) + 8i

$1+20i$

13. 3i + (4 + 14i)

$4+17i$

14. (3 - 15i) + (2 + 9i)

$(3+2)+(-15i+9i)$

$5-6i$

15. (6 + 11i) + (5 - 7i)

$11+4i$

16. (7 - i) - (7 + 5i)

$7-i-7-5i$

$-6i$

17. (10 - 4i) - (9 - 4i)

$10-4i-9+4i$

1

18. $20 - (7 + \sqrt{-9})$

$20-7-3i$

$13-3i$

19. $(10 - 3\sqrt{-16}) + (2 - \sqrt{-25})$

$10-3(4i)+2-5i$

$10-12i+2-5i$

$12-17i$

Intermediate Algebra – Chapter 7
Lesson 4, Day 2

Perform the indicated operation.

1. $\sqrt{-25} \cdot \sqrt{-4}$

$5i \cdot 2i$

$10i^2 \rightarrow 10(-1)$

-10

2. $\sqrt{-9} \cdot \sqrt{-16}$

$3i \cdot 4i$

$12i^2 \rightarrow 12(-1)$

-12

3. $\sqrt{-3}(-\sqrt{-27})$

$i\sqrt{3}(-i\sqrt{9}\sqrt{3})$

$i\sqrt{3}(-3i\sqrt{3})$

$-3i^2(3)$

$-9i^2 \rightarrow -9(-1) = 9$

4. $-\sqrt{-6}(\sqrt{-24})$

$-i\sqrt{6}\, i\sqrt{4}\sqrt{6}$

$-i^2(2)\sqrt{36}$

$-i^2(2)(6)$

$-12i^2 \Rightarrow -12(-1)$

$\boxed{12}$

5. $7i \cdot 9i$

$63i^2$

$63(-1)$

$\boxed{-63}$

6. $11i \cdot 5i$

$55i^2$

$55(-1)$

$\boxed{-55}$

7. $-2i(14i)$

$-28i^2$

$-28(-1)$

$\boxed{28}$

8. $6i(-8i)$

$-48i^2$

$-48(-1)$

$\boxed{48}$

9. $3i(1-i)$

$3i - 3i^2$

$3i - 3(-1)$

$3i + 3$

$\boxed{3+3i}$

10. $2i(5-2i)$

$10i - 4i^2$

$10i - 4(-1)$

$10i + 4$

$\boxed{4+10i}$

11. $(4+2i)(2+3i)$

$8 + 12i + 4i + 6i^2$

$8 + 16i + 6(-1)$

$8 + 16i - 6$

$\boxed{16i + 2}$

12. $(3+5i)(1+4i)$

$3 + 12i + 5i + 20i^2$

$3 + 17i + 20(-1)$

$3 + 17i - 20$

$\boxed{-17 + 17i}$

13. $(10-i)(4+6i)$

$40 + 60i - 4i - 6i^2$

$40 + 56i - 6(-1)$

$40 + 56i + 6$

$\boxed{46 + 56i}$

14. $(8+3i)(1-2i)$

$8 - 16i + 3i - 6i^2$

$8 - 13i - 6(-1)$

$8 - 13i + 6$

$\boxed{14 - 13i}$

15. $(7i-7)(3-5i)$

$21i - 35i^2 - 21 + 35i$

$-21 + 56i - 35i^2$

$-21 + 56i - 35(-1)$

$-21 + 56i + 35$

$\boxed{14 + 56i}$

Intermediate Algebra – Chapter 7

Lesson 4, Day 2

16. $(6+5i)(6-5i)$

$36-30i+30i-25i^2$

$36-25(-1)$

$36+25$

$\boxed{61}$

17. $(7+3i)(7-3i)$

$49-21i+21i-9i^2$

$49-9(-1)$

$49+9$

$\boxed{58}$

18. $(3+2i)^2$

$(3+2i)(3+2i)$

$9+6i+6i+4i^2$

$9+12i+4(-1)$

$9+12i-4$

$\boxed{5+12i}$

19. $\frac{7}{4+i}\frac{(4-i)}{(4-i)}$

$\frac{28-7i}{16-i^2}$

$\frac{28-7i}{16-(-1)}$

$\boxed{\frac{28-7i}{17}}$

20. $\frac{-1}{2+3i}\frac{(2-3i)}{(2-3i)}$

$\frac{-2+3i}{4-9i^2}$

$\frac{-2+3i}{4-9(-1)}$

$\frac{-2+3i}{4+9}$

$\boxed{\frac{-2+3i}{13}}$

21. $-\frac{2}{\sqrt{-49}}$

$-\frac{2(i)}{7i\,(i)}$

$\frac{-2i}{7i^2}$

$\frac{-2i}{7(-1)}$

$\frac{-2i}{-7}$

$\boxed{\frac{2i}{7}}$

22. $\frac{3+5i}{1+i}\frac{(1-i)}{(1-i)}$

$\frac{3-3i+5i-5i^2}{1-i^2}$

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

$\frac{3+2i+5}{2}$

$\frac{8+2i}{2}$

$\boxed{4+i}$

23. $\frac{2-4i}{3-i}\frac{(3+i)}{(3+i)}$

$\frac{6+2i-12i-4i^2}{9-i^2}$

$\frac{6-10i-4(-1)}{9-(-1)}$

$\frac{6-10i+4}{10}$

$\frac{10-10i}{10}$

$\boxed{1-i}$

24. $\frac{6+3i}{2-2i}\frac{(2+2i)}{(2+2i)}$

$\frac{12+12i+6i+6i^2}{4-4i^2}$

$\frac{12+18i+6(-1)}{4-4(-1)}$

$\frac{12+18i-6}{4+4}$

$\boxed{\frac{6-18i}{8}}$

OR

$\boxed{\frac{3-9i}{4}}$