CHAPTER MODULE PREPARATION FORM- chapter 9.1

This assignment is due back at the beginning of the next class. I will collect it and check it off during class.

CHAPTER EXPLANATION/SUMMARY

Describe in your own words the objective(s) of chapter 9.1.

1. Find Square Roots > the number a is the square root of a^2. To find a, you need to find a number that when multiplied to itself, is equal to another number.

If a is a positive real number then: $\sqrt{a}$ is the positive or principle square root of a

$-\sqrt{a}$ is the negative square root of a

For non negative a, $\sqrt{a} \cdot \sqrt{a} = (\sqrt{a})^2 = a$ and $-\sqrt{a} \cdot (-\sqrt{a}) = (-\sqrt{a})^2 = a$ Also, $\sqrt{0} = 0$

2. Decide whether a given root is rational, irrational, or not a real number > All numbers with square roots that are rational are called perfect squares. A number that is not a perfect square has a root that is not a rational number. If $\sqrt{a}$ is a positive real number that is not a perfect square, then $\sqrt{a}$ is irrational.

If a is a negative real number then the $\sqrt{a}$ is not a real number.

3. Find cube, fourth, and other roots > Finding the square root is the reverse of squaring a number. The reverse of finding a cube or fourth or higher of a number called the cube root written $^3\sqrt{a}$ and $^4\sqrt{a}$ and so on.

$^n\sqrt{a}$ > The *n*th root of a is written $^n\sqrt{a}$

4. Graph functions defined by rational expressions > Graph algebraic expressions that contains radicals.

$f(x) = \sqrt{x}$ and $f(x)= {}^3\sqrt{x}$

5. Find *n*th powers > $\sqrt{a^2}$ > for any real number a, $\sqrt{a^2} = |a|$ ... In other words, the principal square root of a^2 is the absolute value of a.

6. Use a calculator to find roots > Radical expressions often represent irrational numbers. To find approximations of such radicals, we usually use a calculator. For example: $\sqrt{15} \approx 3.872983346$ (see pg. 659)

VOCABULARY BUILDING

List and define in your own words some of the key words or phrases that will help you remember how to solve the chapter exercise problems: "radical", "radical sign", "radicand", "radical expression"

Radical: pertaining to or forming a root.

Radical sign: The symbol $\sqrt{}$ > always represents the positive square root except for $\sqrt{0}$

Radicand: The number inside the radical sign

Radical expression: an algebraic expression that contains radicals.

Perfect squares: all numbers with square roots that are rational.

Index/Order:

CONCEPTS OR EXAMPLES THAT STILL NEED CLARIFICATION

In this section note any examples or written explanations in the section that you found confusing or that you could not follow the author's explanation. Specify example number and page or write out the problem in the space below.

13-16

Name_ (over)

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CLAS!

Find all the square roots of each number

1) 9

3

2) 144

12

3) $\frac{25}{196}$

≈ 0.357 (irrational number)

$\frac{5}{14}$

4) 1600

40

find each square root

5) $\sqrt{25}$

5

6) $-\sqrt{121}$

-11

7) $-\sqrt{\frac{144}{121}}$

≈ -1.091 (irrational number)

$\frac{12}{11} \cdot \frac{12}{11} = \frac{144}{121}$

$-\frac{12}{11}$

8) $\sqrt{-121}$

not a real number

Find each root

9) $\sqrt[3]{216}$

6

10) $\sqrt[3]{-125}$

-5

11) $-\sqrt[3]{512}$

8

12) $\sqrt[4]{625}$

5

13) $\sqrt{x^2}$

$\sqrt{x \cdot x}$

14) $\sqrt[3]{x^3}$

$\sqrt[3]{x^3} =$

$\sqrt{(x^3)^3}$

15) $\sqrt[3]{x^{15}}$

$\sqrt{(y^{15})^3}$

16) $\sqrt{x^6}$

$\sqrt{x \cdot x \cdot x \cdot x \cdot x \cdot x}$

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

PLEASE WORK ADDITIONAL PROBLEMS PRIOR TO CLASS. Pages 621-624

CHAPTER MODULE PREPARATION FORM- chapter 9.3

This assignment is due back at the beginning of the next class. I will collect it and check it off during class.

CHAPTER EXPLANATION/SUMMARY

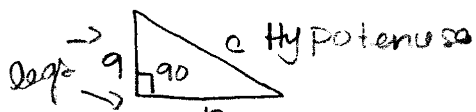
Describe in your own words the objective(s) of chapter 9.3.

1. Use the product rule for radicals > If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers and *n* is a natural number, then:
   $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$ In words, the product of the two *n*th roots is the *n*th root of the product
   *CAUTION: use the product rule only when the radicals have the same index.
2. Use the quotient rule for radicals > similar to the product rule
   If $n\sqrt{a}$ and $n\sqrt{b}$ are real number b = 0, and *n* is a natural number, then

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

3. Simplify radicals > We use the product and quotient rule to simplify radicals. A radical is simplified if the following four conditions are met.
   1. The radicand has no factor raised to a power greater than or equal to the index
   2. The radicand has no fractions
   3. No denominator has a radical
   4. Exponents in the radicand and the index of the radical have greatest common factor 1
4. Simplify products and quotients of radicals with different indexes > multiply and divide radicals with different indexes by using rational indexes.
5. Use the Pythagorean formula > relates the lengths of the sides of a right triangle.
   If a and b are the lengths of the shorter sides of the triangle and c is the length of the longer side of the triangle.

$a^2+b^2=c^2$



$leg^2+leg^2=hypotenuse^2$

6. Use the distance formula > find the distance between two points in the coordinate plane or the length of the segment joining these two planes.
   Distance Formula: The distance between the points (x_1, y_1) and (x_2, y_2) is

$$d=\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$

VOCABULARY BUILDING

List and define in your own words some of the key words or phrases that will help you remember how to solve the chapter exercise problems: "radical expressions", "product rule", "quotient rule", "Pythagorean formula"

Radical Expressions: an algebraic expression that contains radicals.

Product Rule: $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$

Quotient Rule: $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$

Pythagorean Formula: $a^2+b^2=c^2$

CONCEPTS OR EXAMPLES THAT STILL NEED CLARIFICATION

In this section note any examples or written explanations in the section that you found confusing or that you could not follow the author's explanation. Specify example number and page or write out the problem in the space below.

Name_______________________________ **(over)**

WORK OUT THE FOLLOWING PROBLEMS IN ORDER TO PREPARE YOURSELF FOR THE CLASS. Show all your steps if it takes several steps to complete the problem

Multiply or simplify each radical

1) $\sqrt{5}\bullet\sqrt{6}$

$\sqrt{5\cdot 6} =$

$\sqrt{30}$

2) $\sqrt[3]{7x}\bullet\sqrt[3]{4y}$

$\sqrt[3]{7x\cdot 2y} =$

$\sqrt[3]{14xy}$

3) $\sqrt{\frac{3}{25}}$

$\frac{\sqrt{3}}{\sqrt{25}} = \frac{\sqrt{3}}{5}$

4) $\sqrt{\frac{p^6}{81}}$

$\frac{\sqrt{p^6}}{\sqrt{81}} \cdot \frac{\sqrt{(p^3)^2}}{9} = \frac{p^3}{9}$

5) $\sqrt[3]{\frac{27}{64}}$

$\frac{\sqrt[3]{27}}{\sqrt[3]{64}} =$

$\frac{3}{4}$

6) $\sqrt{12}$

$\sqrt{4\cdot 3} =$

$\sqrt{4}\cdot\sqrt{3} =$

$2\sqrt{3}$

7) $-\sqrt{32}$

$-\sqrt{16\cdot 2} = -\sqrt{16}\cdot\sqrt{2}$

$-4\sqrt{2}$

8) $\sqrt{72k^2}$

$\sqrt{36k^2\cdot 2} =$

$\sqrt{36k^2}\cdot\sqrt{2} =$

$6k\sqrt{2}$

9) $-\sqrt{100m^8z^4}$

$-\sqrt{(10m^4z^2)^2} =$

$-10m^4z^2$

10) $-\sqrt[3]{27T^{12}}$

$-\sqrt[3]{(3t^4)^3} =$

$-3t^4$

11) $-\sqrt[3]{-125a^6b^9c^{12}}$

$-\sqrt[3]{(-5a^2b^3c^4)^3} =$

$-(-5a^2b^3c^4) =$

$5a^2b^3c^4$

12) $\sqrt[4]{\frac{1}{16}r^8t^{20}}$

$=\sqrt[4]{\left(\frac{1}{2}r^2t^5\right)^4} =$

$\frac{1}{2}r^2t^5$

13) $\sqrt{\frac{y^{11}}{36}}$

$\frac{\sqrt{y^{11}}}{\sqrt{36}} = \frac{\sqrt{y^{10}\cdot y}}{6}$

$\frac{y^5\sqrt{y}}{6}$

14) $\sqrt[3]{\frac{x^{16}}{27}}$

$\frac{\sqrt[3]{x^{15}\cdot x}}{\sqrt[3]{27}} =$

$\frac{x^5\sqrt[3]{x}}{3}$

15) $\sqrt[3]{4}\bullet\sqrt{3}$ LCI = 6

$\left(\begin{array}{l}\sqrt[3]{4} = 4^{1/3} = 4^{2/6} = \sqrt[6]{4^2} = \sqrt[6]{16} \\ \sqrt{3} = 3^{1/2} = 3^{3/6} = \sqrt[6]{3^3} = \sqrt[6]{27}\end{array}\right)$

$= \sqrt[6]{16}\cdot\sqrt[6]{27} =$

$\sqrt[6]{16\cdot 27} = \sqrt[6]{432}$

PLEASE WORK ADDITIONAL PROBLEMS PRIOR TO CLASS. Pages 641-644