Topic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Starter Problems:

1.  Simplify the following expressions completely.
2. (b)

Review:

If taking the root of the number you are given is not a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ number, then we can use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ squares, cubes, etc. to break it down.

Background: List of perfect squares

1, 4, 9, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, etc.

Review Examples: Simplify each radical expression fully.

 1.) $\sqrt{12}$ 2.) $\sqrt{45}$ 3.) $\sqrt{32}$

4.) $\sqrt{75}$ 5.) $\sqrt{60}$ 6.) $\sqrt{128}$

List of perfect cubes…

1, 8, \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_, etc.

Additional Examples: Simplify each radical expression fully.

10.) $\sqrt[3]{72}$ 11.) $\sqrt[3]{162}$ 12.) $\sqrt[3]{- 192}$

13.) $\sqrt[3]{250}$ 14.) $\sqrt[3]{- 40}$ 15.) $\sqrt[3]{- 432}$

16.) $\sqrt[3]{120}$ 17.) $\sqrt[3]{189}$ 18.) $\sqrt[3]{- 500}$

**19**.) $\sqrt[4]{405}$ **20**.) $\sqrt[5]{224}$

Note:

If the exponent of the variable is NOT divisible by \_\_\_\_\_\_\_\_, then we need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ the variable and take out \_\_\_\_\_\_\_\_\_\_\_\_\_\_ as possible.

Examples: Simplify fully.

1.) $\sqrt{a^{10}b^{9}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.) $\sqrt[3]{c^{5}d^{13}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.) $\sqrt[4]{h^{15}k^{28}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.) $\sqrt[6]{m^{14}n^{3}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Notes:

Finding the nth root of a number depends on whether the number is \_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_ and whether the root is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:

|  |  |  |
| --- | --- | --- |
| $$a$$ | $$n$$ | $$\sqrt[n]{a}$$ |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

We can also simplify radicals that contain both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

To find the nth root of a variable, we need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of the variable by n…

5.) $\sqrt{300p^{27}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6.) $\sqrt[3]{686r^{20}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7.) $\sqrt[4]{2500x^{35}y^{13}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8.) $\sqrt[5]{1701u^{34}w^{11}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Examples: Simplify each expression fully.

1.) $\sqrt{81w^{8}}$ 2.) $\sqrt{49p^{6}}$ 3.) $\sqrt{196h^{12}k^{22}}$

4.) $\sqrt[3]{216j^{15}}$ 5.) $\sqrt[3]{- 729u^{6}}$ 6.) $\sqrt[3]{64a^{21}b^{30}}$

7.) $\sqrt[4]{625c^{8}}$ 8.) $\sqrt[4]{16d^{20}}$ 9.) $\sqrt[4]{2401x^{36}y^{16}}$

10.) $\sqrt[5]{243a^{10}b^{35}}$ 11.) $\sqrt[6]{64c^{12}d^{30}}$ 12.) $\sqrt[7]{- 78125h^{42}k^{21}}$

Extra Practice: Directions: Simplify each expression.

1.) $\sqrt{256a^{20}}$ 2.) $\sqrt[3]{729b^{18}}$

3.) $\sqrt[4]{1296c^{12}}$ 4.) $\sqrt[7]{- 128d^{56}}$

5.) $\sqrt{25g^{16}h^{26}}$ 6.) $\sqrt[3]{125j^{21}k^{3}}$

7.) $\sqrt[4]{81m^{20}n^{28}}$ 8.) $\sqrt[5]{16807p^{10}r^{40}}$

9.) $\sqrt[6]{4096u^{48}v^{60}}$ 10.) $\sqrt[7]{2187x^{35}y^{14}}$

**Homework: Simplifying Radicals**

Directions: Simplify fully by simplifying each expression in radical form.

1.) $\sqrt{m^{9}n^{15}}$

 Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.) $\sqrt{567w^{26}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.) $\sqrt[3]{a^{16}b^{2}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.) $\sqrt[3]{324h^{5}k^{21}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5.) $\sqrt[4]{768x^{20}y^{27}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6.) $\sqrt[5]{288c^{18}d^{5}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7.) $\sqrt{192a^{17}b^{31}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8.) $\sqrt[3]{135g^{11}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9.) $\sqrt[3]{864c^{16}d^{12}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10.) $\sqrt[4]{1250h^{31}k^{24}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11.) $\sqrt[5]{2430m^{17}n^{44}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12.) $\sqrt[6]{320p^{53}r^{10}}$

Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Topic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Starter Problems:

 (1.) Simplify: $\sqrt[6]{729m^{24}n^{42}}$ (2.) Simplify: $\sqrt{5x^{6}y^{3}z} ∙ \sqrt{12x^{5}y^{10}z^{2}}$

Review:

1.) $x^{ 0}$ = 2.) $x^{ 1}$ = 3.) $x^{- 1}$ =

4.) $x^{- 3}$ = 5.) $8^{- 2}$ = 6.) $3^{- 5}$ =

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Rule #1: $x^{^{1}/\_{a}} = $ Rule #2: $x^{^{b}/\_{a}} =$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Examples:

1.) $100^{^{1}/\_{2}} = $ 2.) $625^{^{1}/\_{4}}=$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.) $343^{^{1}/\_{3}} = $ 4.) $\left(- 1024\right)^{^{1}/\_{5}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5.) $64^{^{3}/\_{2}} = $ 6.) $1296^{^{3}/\_{4}} =$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7.) $(- 27)^{^{5}/\_{3}} = $ 8.) $\left(- 32\right)^{^{6}/\_{5}} =$

Rule #3: $x^{^{- 1}/\_{a}} = $ Rule #4: $x^{^{- b}/\_{a}} =$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Examples:

9.) $2401^{^{- 1}/\_{4}}= $ 10.) $729^{^{- 1}/\_{3}}=$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11.) $289^{^{- 1}/\_{2}}= $ 12.) $\left(- 7776\right)^{^{- 1}/\_{5}}= $

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13.) $16^{^{- 7}/\_{4}} = $ 14.) $4096^{^{- 5}/\_{6}} =$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15.) $\left(- 512\right)^{^{- 2}/\_{3}} = $ 16.) $\left(- 243\right)^{^{- 7}/\_{5}} =$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Practice: Simplify each expression.

1.) $125^{\frac{1}{3}}$ 2.) $36^{\frac{3}{2}}$

3.) $27^{\frac{4}{3}}$ 4.) $4096^{\frac{3}{4}}$

5.) $512^{\frac{2}{3}}$ 6.) $6561^{\frac{5}{8}}$

7.) $\left(- 243\right)^{\frac{1}{5}}$ 8.) $\left(- 64\right)^{\frac{5}{3}}$

9.) $\left(- 1024\right)^{\frac{2}{5}}$ 10.) $\left(- 216\right)^{\frac{4}{3}}$

11.) $4096^{- \frac{1}{6}}$ 12.) $81^{- \frac{5}{4}}$

13.) $121^{- \frac{3}{2}}$ 14.) $625^{- \frac{7}{4}}$

15.) $64^{- \frac{5}{6}}$ 16.) $\left(- 1728\right)^{- \frac{1}{3}}$

17.) $\left(- 343\right)^{- \frac{4}{3}}$ 18.) $\left(- 3125\right)^{- \frac{3}{5}}$

19.) $\left(- 8\right)^{- \frac{7}{3}}$ 20.) $\left(- 2187\right)^{- \frac{2}{7}}$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

More Important Rules:

 $\left(x^{m}\right)^{n} =$ $\frac{x^{m}}{x^{n}}$ = $x^{m}∙x^{n}=$

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

New Examples:

1.) $4^{\frac{1}{3}} • 4^{\frac{2}{3}} = $ 2.) $5^{\frac{1}{4}} • 5^{\frac{3}{2}} =$

3.) $7^{\frac{5}{6}} • 7^{\frac{3}{4}} =$ 4.) $\sqrt{3} • \sqrt[4]{3}$ =

5.) $\sqrt[5]{6} • \sqrt[3]{6}$ =

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Examples (cont.):

6.) $\frac{2^{\frac{7}{5}}}{2^{\frac{4}{5}}}$ = 7.) $\frac{3^{\frac{1}{2}}}{3^{\frac{9}{4}}}$ =

8.) $\frac{\sqrt[3]{10}}{\sqrt[4]{10}}$ = 9.) $\frac{\sqrt[5]{8}}{\sqrt{2}}$ =

10.) $\frac{\sqrt[5]{9}}{\sqrt[4]{27}}$ =

**HOMEWORK: Rational Exponents:**

Simplify each expression completely.

1.) $7776^{\frac{1}{5}}$ 2.) $64^{- \frac{1}{2}}$

3.) $81^{\frac{5}{4}}$ 4.) $343^{- \frac{2}{3}}$

5.) $\left(- 1024\right)^{\frac{3}{5}}$ 6.) $\left(- 125\right)^{- \frac{4}{3}}$

7.) $4^{\frac{2}{3}} • 4^{\frac{5}{2}}$ 8.) $\frac{7^{\frac{3}{4}}}{7^{\frac{1}{5}}}$

9.) $\sqrt[4]{5} • \sqrt[3]{5}$ 10.) $\frac{\sqrt[6]{3}}{\sqrt{3}}$

11.) $\sqrt[3]{25} • \sqrt[4]{125}$ 12.) $\frac{\sqrt{343}}{\sqrt[5]{49}}$

**EXTRA PRACTICE**:

Directions: Simplify each expression

1.) $\left(7a^{3}b^{- 5}\right)(4a^{2}b)$ 2.) $\frac{\left(10m^{5}n^{- 1}\right)\left(6m^{- 2}n^{- 4}\right)}{4mn^{- 9}}$

3.) $\left(5c^{4}d^{- 2}\right)^{- 3}$ 4.) $\sqrt[3]{243} • \sqrt{27}$

5.) $\frac{\sqrt[6]{32}}{8^{\frac{4}{5}}}$ 6.) $625^{- \frac{1}{4}}$

7.) $\left(- 7776\right)^{\frac{3}{5}}$ 8.) $\left(- 64\right)^{- \frac{4}{3}}$

*Write the expression in radical form*.

A.  B.  C.  D. 