Unit 3 Day 6

Quiz Day!!!

Warm-Up

Simplify the following:

1. $9\sqrt[3]{16} + \sqrt[3]{54}$

2. $6\sqrt{8x^3y^2} \cdot \sqrt{10xy^3}$

3. $\sqrt[4]{625x^5}$

Solve the following:

4. $\left(\dfrac{5^3}{3^x}\right)^{-2} = \dfrac{3^8}{5^y}$

5. $(x^{\frac{1}{2}})^3 = 27$

6. $\sqrt{a+4} - 4 = a$

Done Early?
Complete Notes
p. 14 and 15
Study Guide
OR
do the
problems on
the next slide!
☺

Done Early with warm-up?
Here's Some More Practice ☺

Solve

7. $\left(\dfrac{3^x}{4^3}\right)^4 = \dfrac{1}{4^y}$

11.

$\sqrt{42 - x} = x$

Simplify

8. $\sqrt[5]{1024x^2y^7}$

9. $3\sqrt[3]{5x^3} \cdot 2\sqrt[3]{50y}$

10. $3\sqrt[3]{16x} + \sqrt[3]{54x}$

Warm-Up

Simplify the following:

1. $9\sqrt[3]{16} + \sqrt[3]{54}$ $\quad 21\sqrt[3]{2}$

2. $6\sqrt{8x^3 y^2} \cdot \sqrt{10xy^3}$ $\quad 24x^2 y^2 \sqrt{5y}$

3. $\sqrt[4]{625x^5}$ $\quad 5x\sqrt[4]{x}$

Solve the following:

4. $\left(\dfrac{5^3}{3^x}\right)^{-2} = \dfrac{3^8}{5^y}$ $\quad y = 6 \quad x = 4$

5. $(x^{\frac{1}{2}})^3 = 27$ $\quad x = 9$

6. $\sqrt{a+4} - 4 = a$ $\quad x = -3, \, -4$

We'll discuss questions on the extra warm-up problems after HW discussion, if time allows! ☺

Homework Solutions
Quiz Review Handout Page 8

1. $\sqrt[3]{x^{16}y^4}$ $\boxed{x^5 y \sqrt[3]{xy}}$

2. $\sqrt[4]{81x^7y^2}$ $\boxed{3x \sqrt[4]{x^3 y^2}}$

3. $5x\sqrt[3]{32x^8}$ **10** $x^3 \boxed{x^3 \sqrt[3]{4x^2}}$
   $8 \cdot 4$

4. $(\sqrt[4]{2x^3})(\sqrt[4]{16x^3})$ $\sqrt[4]{32x^6} = \boxed{2x \sqrt[4]{2x^2}}$

5. $\sqrt[4]{x^{16}y^{18}}$ $\boxed{x^4 y^4 \sqrt[4]{y^2}}$

6. $\sqrt[15]{x^5y^{10}}$ $\boxed{\sqrt[15]{x^5 y^{10}}}$ $\boxed{\text{simplified!}}$

7. $\sqrt[6]{x^4y^2}$ $\boxed{\sqrt[6]{x^4 y^2}}$ $\boxed{\text{simplified!}}$

8. $\sqrt[3]{54x^7y}$ $\boxed{3x^2 \sqrt[3]{2xy}}$

9. $(\sqrt[5]{25x^4})(\sqrt[5]{125x^3})$
   $\sqrt[5]{625x^7} = \boxed{5x\sqrt[5]{x^2}}$

10. $32^{2/5} = 4$

11. $\left(\dfrac{16}{625}\right)^{1/4}$ $\dfrac{16^{1/4}}{625^{1/4}} = \boxed{\dfrac{2}{5}}$

12. $81^{-1/4}$ $\dfrac{1}{81^{1/4}} = \boxed{\dfrac{1}{3}}$

Quiz Review Handout Page 8 Continued…

13. $27^{2/3} = \sqrt[3]{27^2} = \boxed{9}$

14. $216^{-1/3} = \dfrac{1}{216^{1/3}} = \boxed{\dfrac{1}{6}}$

15. $\sqrt[6]{25}$ — $\boxed{\text{simplified!}}$

16. $\sqrt[6]{125}$ — $\boxed{\text{simplified!}}$

17. $(\sqrt[3]{x})(\sqrt{x})$ $x^{\frac{1}{3}} \cdot x^{\frac{1}{2}} = x^{\frac{2}{6}} \cdot x^{\frac{3}{6}} = x^{\frac{5}{6}}$

$\boxed{\sqrt[6]{x^5}}$

18. $(\sqrt[4]{x^3})(\sqrt{3x})$ $x^{\frac{3}{4}} \cdot 3^{\frac{1}{2}} \cdot x^{\frac{1}{2}} = 3^{\frac{1}{2}} \cdot x^{\frac{3}{4}} \cdot x^{\frac{2}{4}}$

$= x^{\frac{5}{4}} \cdot 3^{\frac{2}{4}} = \sqrt[4]{3^2 x^5} = \boxed{x\sqrt[4]{9x}}$

23. $(\sqrt[4]{a^3})(\sqrt[4]{a^3})$ $a^{\frac{3}{4}} \cdot a^{\frac{3}{4}} = a^{\frac{6}{4}} = \sqrt[4]{a^6}$

$= \boxed{a\sqrt[4]{a^2}}$

24. $\sqrt[3]{64x^5 y^{10} z^{21}}$

$= \boxed{4xy^3 z^7 \sqrt[3]{x^2 y}}$

Homework Solutions
Quiz Review Handout Page 9

Solve

25. $(b)^2 = \left(\sqrt{-4+4b}\right)^2$
$b^2 = -4 + 4b$
$b^2 - 4b + 4 = 0$
$(b-2)(b-2) = 0$
$\boxed{b=2}$

$2 = \sqrt{-4+4(2)}$
$2 = \sqrt{4}$
$2 = 2 \checkmark$

26. $(r)^2 = \left(\sqrt{8r}\right)^2$
$r^2 = 8r$
$r^2 - 8r = 0$
$r(r-8) = 0$
$\boxed{r = 0, 8}$

$0 = \sqrt{8(0)}$
$0 = 0 \checkmark$

$8 = \sqrt{8(8)}$
$8 = \sqrt{64}$
$8 = 8 \checkmark$

27. $\left(\sqrt{-16+10a}\right)^2 = (a)^2$
$-16 + 10a = a^2$
$0 = a^2 - 10a + 16$
$0 = (a-2)(a-8)$
$\boxed{a = 2, 8}$

$\sqrt{-16+10(2)} = 2$
$\sqrt{4} = 2$
$2 = 2 \checkmark$

$\sqrt{-16 + 10(8)} = 8$
$\sqrt{64} = 8 \checkmark$

28. $(r)^2 = \left(\sqrt{-1-2r}\right)^2$
$r^2 = -1 - 2r$
$r^2 + 2r + 1 = 0$
$(r+1)(r+1) = 0$
$\cancel{r = -1}$

$-1 = \sqrt{-1-2(-1)}$
$-1 = \sqrt{1}$
$-1 \neq 1$

No solution!

29. $(5)^2 = \left(\sqrt{r-3}\right)^2$
$25 = r - 3$
$\boxed{28 = r}$

$5 = \sqrt{28-3}$
$5 = \sqrt{25}$
$5 = 5 \checkmark$

30. $\left(\sqrt{2m-6}\right)^2 = \left(\sqrt{3m-14}\right)^2$
$2m - 6 = 3m - 14$
$\boxed{8 = m}$

$\sqrt{2(8)-6} = \sqrt{3(8)-14}$
$\sqrt{16-6} = \sqrt{24-14}$
$\sqrt{10} = \sqrt{10} \checkmark$

Homework Solutions
Quiz Review Handout Page 8 Continued…

31. $(20-r)^{\frac{1}{2}\cdot 2} = (r)^2$

$20 - r = r^2$

$0 = r^2 + r - 20$

$0 = (r-4)(r+5)$

$\boxed{r = 4}, \, \cancel{-5}$

$\begin{cases} (20-4)^{\frac{1}{2}} = 4 \\ 16^{\frac{1}{2}} = 4 \checkmark \\ 4 = 4 \checkmark \\ \rule{4cm}{0.4pt} \\ (20-(-5))^{\frac{1}{2}} = -5 \\ (20+5)^{\frac{1}{2}} = -5 \\ 25^{\frac{1}{2}} = -5 \\ 5 = -5 \; \cancel{\bigcirc} \end{cases}$

32. $(6b)^{\frac{1}{2}\cdot 2} = (8-2b)^{\frac{1}{2}\cdot 2}$

$6b = 8 - 2b$

$\underline{8b = 8}$

$\boxed{b = 1}$

$(6(1))^{\frac{1}{2}} = (8-2(1))^{\frac{1}{2}}$

$6^{\frac{1}{2}} = 6^{\frac{1}{2}} \checkmark$

33. $9 + 5\sqrt[3]{2m} = 29$

$\dfrac{5\sqrt[3]{2m}}{5} = \dfrac{20}{5}$

$\left(\sqrt[3]{2m}\right)^3 = (4)^3$

$2m = 64$

$\boxed{m = 32}$

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

$\left(x^{\frac{3}{2}}\right)^{\frac{2}{3}} = (27)^{\frac{2}{3}}$

$x = 27^{\frac{2}{3}}$

$\boxed{x = 9}$

Tonight's Homework

Packet Pg. **10-11 Odds** AND
Problems **#4, #12**

Remember to use your notes when you get stuck on HW or CW problems!

HINT: Yesterday's notes will help with tonight's HW. ☺

Done Early with warm-up?
Here's Some More Practice ☺

Solve

7. $\left(\dfrac{3^x}{4^3}\right)^4 = \dfrac{1}{4^y}$

$x = 0$

$y = 12$

11.

$\sqrt{42 - x} = x$

$x = 6$

Done Early with warm-up?
Here's Some More Practice ☺

Simplify

8. $\sqrt[5]{1024x^2y^7}$ $\qquad$ $4y\sqrt[5]{x^2y^2}$

9. $3\sqrt[3]{5x^3} \cdot 2\sqrt[3]{50y}$ $\qquad$ $30x\sqrt[3]{2y}$

10. $3\sqrt[3]{16x} + \sqrt[3]{54x}$ $\qquad$ $9\sqrt[3]{2x}$

Making A Study Guide

Days 1-4 of Unit 3 ☺

Study Guide

- Multiplying Exponential Functions:

$$a^m \cdot a^n = \underline{a^{m+n}}$$

- Dividing Exponential Functions:

$$\frac{a^m}{a^n} = \underline{a^{m-n}}$$

- Negative Exponential Functions:

$$\frac{1}{a^n} = \underline{a^{-n}}$$

- Exponential Functions Raised to a Power:

$$(a^m)^n = \underline{a^{m \cdot n}} \qquad\qquad (a \cdot b)^n = \underline{a^n \cdot b^n}$$

Study Guide Continued…

$$\text{index} \rightarrow \sqrt[n]{x} = r \leftarrow \text{root}$$
$$\uparrow$$
$$\text{radicand}$$

$$(x)^{\frac{1}{n}} = r$$
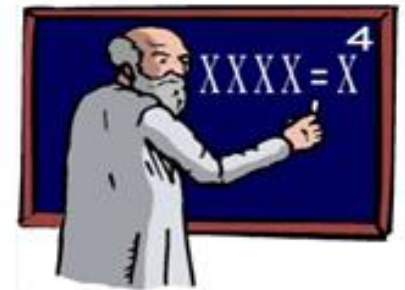
index

radicand   root

$$XXXX = X^4$$

Multiplying Radicals ~

- Characteristics And Properties For Doing This:

Make sure the index is the same!!
1. Multiply the <u>coefficients.</u>
2. Multiply the <u>radicands.</u>
3. Simplify!!

- Example(s)

$$2\sqrt[3]{3x^2} \bullet \sqrt[3]{18x^2}$$

Adding And Subtracting Radicals ~
- Characteristics And Properties For Doing This:

- Only combine **like radicals**.
-Add/Subtract only when the radicals have the **same** index and **same** radicand.
-When you add/subtract, you add the coefficients. However, **the radicands do not change**.
-Always **SIMPLIFY Completely**.

- Example(s)

$$2\sqrt[3]{3x^2} - \sqrt[3]{81x^2}$$

On the Calculator:

Reminder: To use your calculator:

Step 1: Type in the radicand in the base of the exponent.

Step 2: Raise the base (Using this following symbol " ^ ") to the power of the 1/(index).

OR

Reminder: To use your calculator:

Step 1: Type in the index.

Step 2: Press MATH

Step 3: Choose 5: $\sqrt[x]{}$

Step 4: Type in the radicand.

Before solving the entire problem:

*Isolate the radical or rational exponent on one side of the equation.

→ You can isolate the radical using the inverses!!!

Circle the correct answer:

– Can you ***Sometimes*/*Always*/*Never*** check your answers by substituting your solution into the equation to make sure it works?

– How often should you check?   Every equation!

"Radical"

1. Isolate the radical/Get the radical Alone

2. Do the inverse operation.

3. Solve for the variable

4. Check the solution

 - Extraneous solution? Or Actual Solution? Or No Solution?

"Rational Exponent"

1. Isolate the Exponent/Get the Exponent Alone

2. Do the inverse operation.

3. Solve for the variable

4. Check the solution

 - Extraneous solution? Or Actual Solution? Or No Solution?

Extended Practice

Everyone needs Pair Up into groups of two. Each Group should have the following:

Two Pieces Of Paper

One Pencil

One Whiteboard

One Whiteboard marker

AND A Calculator

(Everything Else Needs To Be Put Away!!)

Solve for x and y

$$\left(\frac{3^x}{4^3}\right)^4 = \frac{1}{4^y}$$

$$x = 0$$

$$y = 12$$

Simplify

$$\sqrt[5]{1024x^2y^7}$$

$$4y\sqrt[5]{x^2y^2}$$

Simplify

$$3\sqrt[3]{5x^3} \cdot 2\sqrt[3]{50y}$$

$$\boxed{30x\sqrt[3]{2y}}$$

Simplify

$$3\sqrt[3]{16x} + \sqrt[3]{54x}$$

$$\boxed{9\sqrt[3]{2x}}$$

Solve for x

$$\sqrt{42 - x} = x$$

$$\boxed{x = 6}$$

Quiz Time!!

When you are finished with the quiz, begin working on your homework:

Packet Pg. **10-11 Odds** AND Problems **#4, #12**

Remember to use your notes when you get stuck on HW or CW problems!

HINT: Yesterday's notes will help with tonight's HW. ☺