Warm-up

Simplify the following expressions:

6) $-3\sqrt{17} - 4\sqrt{17}$

$-7\sqrt{17}$

10) $2\sqrt{6} + 3\sqrt{54}$

$9\sqrt{6} + 2\sqrt{6}$

$3\cdot3\sqrt{6} + 2\sqrt{6} =$

$11\sqrt{6}$

$3\cdot2 \qquad 9\cdot6$

$3\cdot3$

Solve $5x^2 - 3 = 317$ for x.

$+3 \quad +3$

a. $x = 39.6$ $\qquad \dfrac{5x^2}{5} = \dfrac{320}{5}$

b. $x = \pm7.8$

c. $x = \pm8$

d. $x = 8$

$\sqrt{x^2} = \sqrt{64} \qquad x = \pm8$

$1^2 = 1$
$2^2 = 4$
$3^2 = 9$
$4^2 = 16$
$5^2 = 25$
$6^2 = 36$
$7^2 = 49$
$8^2 = 64$
$9^2 = 81$
$10^2 = 100$

Agenda:
1) Test Correction Procedures

2) Operations with RADicals!!! part 2 (x/ ÷ and rationalizing) - Notes.

3) Quiz Bowl - in groups.

4) Time for the Project

ARE YOU READY?

Rules and Properties: Square Root Expressions in Simplest Form

An expression involving square roots is in *simplest form* if

1. There are no perfect-square factors in a radical.
2. No fraction appears inside a radical.
3. No radical appears in the denominator.

$1^2 = 1$
$2^2 = 4$
$3^2 = 9$
$4^2 = 16$
$5^2 = 25$
$6^2 = 36$
$7^2 = 49$
$8^2 = 64$
$9^2 = 81$
$10^2 = 100$

Learn Cubes from 1 to 15

$1^3 = 1$	$6^3 = 216$	$11^3 = 1331$
$2^3 = 8$	$7^3 = 343$	$12^3 = 1728$
$3^3 = 27$	$8^3 = 512$	$13^3 = 2197$
$4^3 = 64$	$9^3 = 729$	$14^3 = 2744$
$5^3 = 125$	$10^3 = 1000$	$15^3 = 3375$

What is the simplest form of $\sqrt{45x^5y^3} \cdot \sqrt{35xy^4}$?

$3x^2y\sqrt{5xy} \cdot y^2\sqrt{35x}$

$3 \cdot 15$

$3 \cdot 5$

$7 \cdot 5$

$3x^2y^3 \sqrt{5 \cdot 35x^2y}$

$5 \cdot 7$

$3x^2y^3 \cdot 5x\sqrt{7y} = \boxed{15x^3y^3\sqrt{7y}}$

$(4+\sqrt{2})(5+\sqrt{3})$

$$20+4\sqrt{3}+5\sqrt{2}+\sqrt{6}$$

$(4+x)(5+y)$

$(2-\sqrt{5})(3\sqrt{3}-\sqrt{10})$

$$6\sqrt{3}-2\sqrt{10}-3\sqrt{15}+\sqrt{50}$$

$$6\sqrt{3}-2\sqrt{10}-3\sqrt{15}+5\sqrt{2}$$

$25 \cdot 2$

$5 \cdot 5$

Rules and Properties: Square Root Expressions in Simplest Form

An expression involving square roots is in *simplest form* if

1. There are no perfect-square factors in a radical.
2. No fraction appears inside a radical.
3. No radical appears in the denominator.

NUMERATOR $\rightarrow \dfrac{2}{5} \leftarrow$ DENOMINATOR

Property Combining Radical Expressions: Quotients

If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers and $b \neq 0$, then $\dfrac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\dfrac{a}{b}}$.

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

What is the simplest form of the quotient?

A $\dfrac{\sqrt{18x^5}}{\sqrt{2x^3}}$

$\dfrac{18x^5}{2x^3} = 9x^2$

$\dfrac{\sqrt{18x^5}}{\sqrt{2x^3}} = \sqrt{\dfrac{18x^5}{2x^3}}$

$= \sqrt{9x^2}$

$= 3x$

Me doing math
- geome**try**
- geome**cry**
- geome**why**
- geome**bye**

What is the simplest form of $\dfrac{\sqrt{50x^6}}{\sqrt{2x^4}}$?

$\sqrt{\dfrac{50x^6}{2x^4}} = \sqrt{25x^2} = \boxed{5x}$

$y \cdot y \cdot y$

B $\dfrac{\sqrt[3]{162y^5}}{\sqrt[3]{3y^2}}$

$\sqrt[3]{\dfrac{162y^5}{3y^2}} = \sqrt[3]{54y^3}$

$9 \cdot 6$

$3 \cdot 3 \cdot 3 \cdot 2$

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

What if you don't have radicals top and bottom?

$$\frac{1}{\sqrt{2}}$$

Another way to simplify a radical expression is to **rationalize the denominator**. You rewrite the expression so that there are no radicals in any denominator and no denominator in any radical.

rationalize

Multiply by 1.

$$\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{\sqrt{2}}{2}$$

The product of $\sqrt{2}$ and itself is a rational number, 2.

$$\sqrt{2} \cdot \sqrt{2} = \sqrt{4} = 2$$

$$\frac{3}{5} \quad \begin{array}{l} \leftarrow \text{numerator} \\ \leftarrow \text{denominator} \end{array}$$
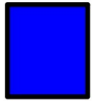
$$\frac{3}{5} \leftarrow \text{numerator}$$
$$\quad \leftarrow \text{denominator}$$

5) $\dfrac{4}{\sqrt{5}} \cdot \left(\dfrac{\sqrt{5}}{\sqrt{5}}\right)$

$$\boxed{\dfrac{4\sqrt{5}}{5}}$$

6) $\dfrac{\sqrt{4}}{5\sqrt{3}} = \dfrac{2}{5\sqrt{3}}$

$$\dfrac{2}{5\sqrt{3}} \cdot \left(\dfrac{\sqrt{3}}{\sqrt{3}}\right) = \dfrac{2\sqrt{3}}{5 \cdot 3}$$

$$\boxed{\dfrac{2\sqrt{3}}{15}}$$

15) $\dfrac{3}{4+4\sqrt{5}}$

7) $\dfrac{3}{4+4\sqrt{5}} \left(\dfrac{4-4\sqrt{5}}{4-4\sqrt{5}}\right)$

$\sqrt{5}(4+4\sqrt{5})$

$4\sqrt{5} + 4\sqrt{25}$

$\dfrac{12-12\sqrt{5}}{16-16\sqrt{5}+16\sqrt{5}-16\sqrt{25}}$ $4\sqrt{5}+20$

$5 \cdot 5$

$\dfrac{12-12\sqrt{5}}{16-(16\cdot 5)} = \dfrac{12-12\sqrt{5}}{16-80} = \boxed{\dfrac{12-12\sqrt{5}}{-64}}$
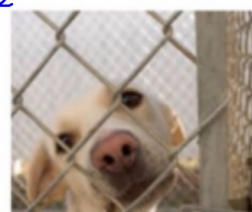
$\dfrac{5}{80}$

Review Rationalizing Denominator:

a) $\dfrac{\sqrt{2x}}{\sqrt{4y}}$ = $\dfrac{\sqrt{2x}}{2\sqrt{y}}\left(\dfrac{\sqrt{y}}{\sqrt{y}}\right) = \dfrac{\sqrt{2xy}}{2y}$

STOP

b) $\dfrac{\sqrt{8x^3}}{\sqrt{2x^5}}$ = $\sqrt{\dfrac{8x^3}{2x^5}}$ = $\sqrt{\dfrac{4}{x^2}}$ = $\dfrac{\sqrt{4}}{\sqrt{x^2}}$ = $\dfrac{2}{x}$

I SHOULD BE DOING MY HOMEWORK NOW. BUT THE WAY *I* LOOK AT IT, PLAYING IN THE SNOW IS A LOT MORE IMPORTANT. OUT HERE I'M LEARNING REAL SKILLS THAT I CAN APPLY THROUGHOUT THE REST OF MY LIFE. SUCH AS? PROCRASTINATING AND RATIONALIZING.

© 1993 Watterson/Distributed by Universal Uclick   2-18

Problem 5 Rationalizing the Denominator

Multiple Choice What is the simplest form of $\sqrt[3]{\dfrac{5x^2}{12y^2z}}$?

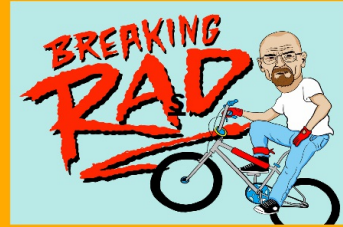(A) $\dfrac{\sqrt[3]{90x^2yz^2}}{6yz}$

(B) $\dfrac{\sqrt[3]{5x^2}}{\sqrt[3]{12y^2z}}$

(C) $\dfrac{5\sqrt[3]{x^2yz^2}}{yz}$

(D) $5\sqrt[3]{x^2z}$

What is the simplest form of $\dfrac{\sqrt[3]{7x}}{\sqrt[3]{5y^2}}$?

Conclusion:

1. <u>Multiplication</u>: Coefficients with Coefficients / RADicals with RADicals

2. <u>Divison</u>: Put in under one radical (house). Simplify.
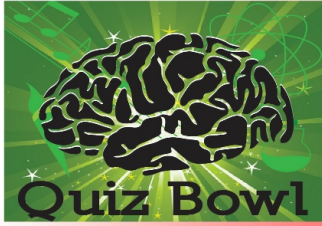
     OR

     Rationalize!!!

Rationalizing

$$\frac{3}{\sqrt{6}} = \frac{\sqrt{6}}{2}$$

*Quiz Bowl!*

2 minutes! - Groups of 4

Quiz Bowl!

Roles:
- **Leader /Runner / Reviewer /Reporter**
- *Leader:* keeps the group on pace and check other members.
- *Runner:* Picks up / Drop offs problems.
- *Reviewer:* Checks group's work & answer.
- *Reporter:* Reports the answer to Ms.Brady "Number ___, answer is____"

Rules:
- Each round has <u>5</u> questions.
- The group that finishes 5 questions fastest wins the round.
- The winning group will get <u>extra credit</u> on the quiz tomorrow!
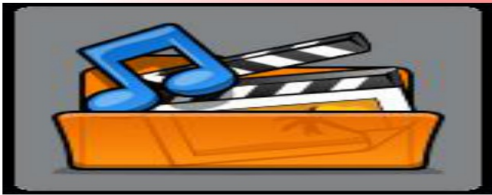
Art Project

- Work on your project for the rest of the class!
- Feel free to ask Ms. Brady questions!
- Art supplies are located at the front!

Expectations:
Talking volume < Music volume
Till the rest of the class
Clean your area afterwards