

Hand in disclosure - due tomorrow

Find and sit in assigned seat!

Bell Ringer



Wednesday 11/20

Simplify each radical.

Handwritten student work for simplifying radicals:

- $\sqrt{32} = 2 \cdot 2 \sqrt{2} = 4\sqrt{2}$ (with prime factorization of 32 shown)
- $\sqrt{4x^2} = 2x$ (with prime factorization of $4x^2$ shown)
- $4n^2\sqrt{3n}$ (written in red)
- $\sqrt{48n^5} = 2 \cdot 2 \cdot n \cdot \sqrt{3n}$ (written in red)
- $\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$ (written in green)
- $\sqrt{\frac{25v^2}{36}} = \frac{5v}{6}$ (written in black)
- $\sqrt{\frac{25v^2}{36}}$ (written in black)
- $\sqrt[3]{8h^4} = \frac{2h\sqrt[3]{h}}{3}$ (written in blue)
- $\sqrt[3]{27} = 3$ (written in blue)
- $\frac{2h\sqrt[3]{h}}{3}$ (written in blue)

Rationalizing the Denominator. The process by which a fraction is rewritten so that the denominator contains only rational numbers.

AKA get all roots out of the denominator!!!

$$\frac{a}{\cancel{\sqrt{b}}}$$

Rationalize the denominator example...

$$\frac{\sqrt{5}}{\sqrt{3n}} \cdot \frac{\sqrt{3n}}{\sqrt{3n}} = \frac{\sqrt{5 \cdot 3n}}{\sqrt{3n \cdot 3n}} = \frac{\sqrt{15n}}{\sqrt{9n^2}} = \frac{\sqrt{15n}}{3n}$$

The handwritten work shows the final denominator as $3n$ with a circled 3 and an arrow pointing to the n in the numerator of the previous step, indicating the simplification of $\sqrt{9n^2}$ to $3n$.

Simplify each expression.

$$13. \frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$$

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

$$14. \frac{\sqrt{10}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$\frac{\sqrt{30}}{\sqrt{9}} = \frac{\sqrt{30}}{3}$$

$\begin{array}{r} 30 \\ \swarrow \searrow \\ 2 \quad 15 \\ \swarrow \searrow \\ 2 \quad 5 \end{array}$

$$15. \frac{7}{\sqrt{2x}} \cdot \frac{\sqrt{2x}}{\sqrt{2x}}$$

$$\frac{7\sqrt{2x}}{2x}$$

$$16. \sqrt{\frac{2y^2}{3}} = \frac{\sqrt{2y^2}}{\sqrt{3}}$$

$$\frac{\sqrt{4y^2}}{\sqrt{3}} = \frac{2y}{\sqrt{3}}$$

How to rationalize the denominator when it's a cube root...

$$\frac{2}{\sqrt[3]{9}} \frac{\sqrt[3]{3}}{\sqrt[3]{3}} = \frac{2\sqrt[3]{3}}{\sqrt[3]{27}} \rightarrow \frac{2\sqrt[3]{3}}{3}$$

Handwritten annotations: Under the 9 in the first denominator, there is a caret (^) above a 3, and a line pointing to a 3 · 3 below it. Under the 27 in the second denominator, there is a caret (^) above a 3, and a line pointing to a 3 · 3 below it, which is circled.

$$\begin{array}{c}
 \frac{5}{\sqrt[3]{36}} \cdot \frac{\sqrt[3]{6}}{\sqrt[3]{6}} = \frac{\sqrt[3]{216}}{\sqrt[3]{6 \cdot 6 \cdot 6}} \\
 \frac{5\sqrt[3]{6}}{6}
 \end{array}
 \quad
 \begin{array}{c}
 \frac{-10}{\sqrt[3]{16}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}} = \frac{-10\sqrt[3]{4}}{4}
 \end{array}$$

The conjugate has the opposite sign between the 2 terms. It can be used to simplify expressions when there are two terms in the denominator.

Simplify $\frac{7}{2 - \sqrt{3}} \cdot \frac{2 + \sqrt{3}}{2 + \sqrt{3}}$

$$4 + \cancel{2\sqrt{3}} - \cancel{2\sqrt{3}} - 3 = 1$$

What would you multiply by to rationalize the denominator??

$$\frac{8}{1+\sqrt{3}} \cdot \frac{1-\sqrt{3}}{1-\sqrt{3}}$$

$$\frac{\sqrt{13}}{\sqrt{5}-2} \cdot \frac{\sqrt{5}+2}{\sqrt{5}+2}$$

$$\frac{12}{\sqrt{2}+\sqrt{7}} \cdot \frac{\sqrt{2}-\sqrt{7}}{\sqrt{2}-\sqrt{7}}$$

due tomorrow

4.1 Day 1 hw

pg 197-198 #s 1-3, 13, 17-31 odd, 35, 37, 45-53 odd



Essential Question:

How do you evaluate, add, subtract and multiply radicals?

Evaluate the function for $x = 3$. Write your answer in simplest form and in decimal form rounded to the nearest hundredth.

$$g(x) = \frac{\sqrt{2(3)}}{4 + \sqrt{3(3)}}$$
$$= \frac{\sqrt{6}}{4 + \sqrt{9}} = \frac{\sqrt{6}}{4 + 3} = \frac{\sqrt{6}}{7}$$

$$h(x) = \sqrt{\frac{4(3)}{5(3)^2 + 2}} = \frac{\sqrt{12}}{\sqrt{47}}$$
$$= \frac{2\sqrt{3}}{\sqrt{47}}$$

Handwritten work for $h(x)$ shows a tree diagram for 12: 12 is the product of 3 and 4, and 4 is the product of 2 and 2. The 2s are circled.

The distance d (in miles) that you can see to the horizon with your eye level h feet above the water is given by $d = \sqrt{\frac{3h}{2}}$. How far can you see when your eye level is 5 feet above the water?



How far can you see when your eye level is 35 feet above the water?

Square Roots and Addition

Is $\sqrt{36} + \sqrt{64}$ equal to $\sqrt{36+64}$?

$$= 6 + 8$$
$$= 14$$

$$= \sqrt{100}$$
$$= 10$$

In general, is $\sqrt{a} + \sqrt{b}$ equal to $\sqrt{a+b}$?

$$\sqrt{7} + \sqrt{5} \neq \sqrt{12}$$

Square Roots and Subtraction

Is $\sqrt{64} - \sqrt{36}$ equal to $\sqrt{64-36}$?

$$8 - 6$$

$$\sqrt{28}$$

2

In general, is $\sqrt{a} - \sqrt{b}$ equal to $\sqrt{a-b}$?

To Add or subtract the radicals:

We can only combine like radicals. To be alike the radicand (number under the square root) needs to be the same.

$$-2x + 8x = 6x$$

$$\begin{aligned} &\underline{-2\sqrt[3]{6} + 8\sqrt[3]{6}} \\ &= 6\sqrt[3]{6} \end{aligned}$$

$$\begin{aligned} &+7y - 20y \quad 7\sqrt{3} - 5\sqrt{48} \\ &\underline{-1\sqrt{3} - 20\sqrt{3}} \\ &= -13\sqrt{3} \end{aligned}$$

$$\begin{aligned} &5\sqrt{48} \\ &= 5\sqrt{16 \cdot 3} \\ &= 5 \cdot 4\sqrt{3} \\ &= 20\sqrt{3} \end{aligned}$$

Simplify

$$\begin{array}{l} \underline{5\sqrt{7}} + \sqrt{11} - \underline{8\sqrt{7}} \\ -3\sqrt{7} + \sqrt{11} \end{array}$$

Simplify

$$10\sqrt{5} + \sqrt{20}$$

$10\sqrt{5} + 2\sqrt{5}$
 $\boxed{12\sqrt{5}}$

Simplify

$$6\sqrt[3]{x} + 2\sqrt[3]{x}$$

$$= 8\sqrt[3]{x}$$

Simplify

$$\frac{3\sqrt{2} - \sqrt{6} + 10\sqrt{2}}{13\sqrt{2} - \sqrt{6}}$$

Simplify

$$4\sqrt{7} - 6\sqrt{63}$$

Simplify

$$4\sqrt[3]{5x} - 11\sqrt[3]{5x}$$

Multiplication of radicals: We multiply the coefficients (numbers outside radicals) together and multiply the radicands (numbers inside the radicals) together.

"Outside times Outside and Inside times Inside"

Just like this!

$$2x(5y + 3)$$

$$10xy + 6x$$

$$2\sqrt{3}(5\sqrt{6} + 3)$$

$$2 \cdot 10\sqrt{18} + 6\sqrt{3}$$

$$30\sqrt{2} + 6\sqrt{3}$$

Simplify

I do...

$$\sqrt{3}(8\sqrt{2} + 7\sqrt{32})$$

$$8\sqrt{6} + 4 \cdot 7\sqrt{96}$$

$$\begin{array}{c} \sqrt{32} \\ \sqrt{4 \cdot 8} \\ \sqrt{4} \cdot \sqrt{8} \\ 2 \cdot \sqrt{8} \\ 2 \cdot 2\sqrt{2} \\ 4\sqrt{2} \end{array}$$

$$8\sqrt{6} + 28\sqrt{6}$$

$$= 36\sqrt{6}$$

$$(2\sqrt{5} - 4)^2$$

$$\sqrt[3]{-4}(\sqrt[3]{2} - \sqrt[3]{16})$$

Simplify

We do...

$$\cdot 3\sqrt{5}(-\sqrt{18} + 3\sqrt{8})$$

Simplify

You do w/ partner...

$$-\sqrt{6}(\sqrt{24} + 4\sqrt{54})$$

Simplify

$$\sqrt{5}(\sqrt{3} - \sqrt{75})$$

You do alone...

4.1 Day 2 hw due Friday

Pg 199 #s 65-97, skip #73

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