

Warm Up:
Simplify the following radical expressions.

1. $\sqrt[4]{128x^7y^7}$
 $= \sqrt[4]{2^7 \cdot 2^2 \cdot x^7 \cdot y^7}$
 $= \sqrt[4]{2^9 \cdot x^7 \cdot y^7}$
 $= 2x^2y^2 \sqrt[4]{2xy}$

2. $\sqrt[3]{-16a^3b^8}$
 $= \sqrt[3]{-2^4 \cdot a^3 \cdot b^8}$
 $= -2ab^2 \sqrt[3]{2b^2}$

3. Are the two lines parallel, perpendicular, or neither. $y + 8 = -1/2x$ and $x - 2y = -10$
 $y + 8 = -1/2x$
 $y = -1/2x - 8$
 $x - 2y = -10$
 $x - 2(-1/2x - 8) = -10$
 $x + x + 16 = -10$
 $2x = -26$
 $x = -13$
 $y = -1/2(-13) - 8 = 6.5 - 8 = -1.5$
 $y = -x + 5$
Neither

4. Find the slope of $(-3, 5)$ and $(-3, 1)$.
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 5}{-3 - (-3)} = \frac{-4}{0}$ **undef**
vert. line

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6) $4x \sqrt{512x^3y^2z^4}$
 $4x \sqrt{2^9 \cdot x^3 \cdot y^2 \cdot z^4}$
 $4x \cdot 2^2 \cdot x \cdot y \cdot z^2 \sqrt{2xy}$
 $16x^2yz^2 \sqrt{2xy}$

$512 \div 2 = 256$
 $16 \times 16 = 256 = 16^2$

$= 4x \sqrt{2(16)(16)xy z^2 z^2}$
 $= 64x^2z^2 \sqrt{2xy}$

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Operations with Radicals Part 1

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Adding and Subtracting: Only combine terms with "like radicands"

****Make sure to reduce first!**

Examples:

1) $-3\sqrt{5} + 2\sqrt{5}$
 $= -1\sqrt{5}$
 $= -\sqrt{5}$

2) $-3\sqrt{12} + 3\sqrt{3} + 3\sqrt{20}$
 $-3\sqrt{2 \cdot 2 \cdot 3} + 3\sqrt{3} + 3\sqrt{2 \cdot 2 \cdot 5}$
 $-6\sqrt{3} + 3\sqrt{3} + 6\sqrt{5}$
 $-3\sqrt{3} + 6\sqrt{5}$

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More Adding and Subtracting:

Examples:

3) $-\sqrt{12} + 3\sqrt{3}$
 $= -2\sqrt{3} + 3\sqrt{3}$
 $= 1\sqrt{3}$
 $= \sqrt{3}$

4) $\sqrt{8} - \sqrt{32}$
 $\sqrt{4(2)} - \sqrt{2(16)}$
 $2\sqrt{2} - 4\sqrt{2} = -2\sqrt{2}$

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4) $-3\sqrt{18} + 3\sqrt{8} - \sqrt{24}$
 $= -9\sqrt{2} + 6\sqrt{2} - 2\sqrt{6}$
 $= -3\sqrt{2} - 2\sqrt{6}$

$\sqrt{24} = \sqrt{2 \cdot 2 \cdot 2 \cdot 3} = 2\sqrt{6}$

$-3\sqrt{18} = -3\sqrt{2 \cdot 3 \cdot 3 \cdot 3} = -9\sqrt{2}$

$3\sqrt{8} = 3\sqrt{2 \cdot 2 \cdot 2} = 6\sqrt{2}$

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You Try!!

$$\begin{aligned}
 5) & 3\sqrt{18} + 3\sqrt{12} + 2\sqrt{27} \\
 &= 9\sqrt{2} + 6\sqrt{3} + 6\sqrt{3} \\
 &= 9\sqrt{2} + 12\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 & 3\sqrt{18} \\
 &= 3\sqrt{2 \cdot 3 \cdot 3} \\
 &= 9\sqrt{2} \\
 & 3\sqrt{12} \\
 &= 3\sqrt{2 \cdot 2 \cdot 3} \\
 &= 6\sqrt{3} \\
 & 2\sqrt{27} \\
 &= 2\sqrt{3 \cdot 3 \cdot 3} \\
 &= 6\sqrt{3}
 \end{aligned}$$

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#5 Homework

$$\begin{aligned}
 & -\sqrt[3]{320} - 4\sqrt[3]{5} + 2\sqrt[3]{135} + 2\sqrt[3]{16} \\
 & -4\sqrt[3]{5} - 4\sqrt[3]{5} + 6\sqrt[3]{5} + 4\sqrt[3]{2} \\
 & -2\sqrt[3]{5} + 4\sqrt[3]{2}
 \end{aligned}$$

$$\begin{aligned}
 & \sqrt[3]{320} = \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = 4\sqrt[3]{2} \\
 & \sqrt[3]{135} = \sqrt[3]{3 \cdot 3 \cdot 3 \cdot 5} = 3\sqrt[3]{5} \\
 & \sqrt[3]{16} = \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 2} = 2\sqrt[3]{2}
 \end{aligned}$$

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15 minutes on Practice problems

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Multiplying: Multiply #'s inside radicals and outside radicals separately and simplify

Examples:

$$\begin{aligned}
 1) & \sqrt{5} \cdot \sqrt{3} \\
 &= \sqrt{5(3)} \\
 &= \sqrt{15}
 \end{aligned}$$

$$\begin{aligned}
 2) & 3\sqrt{3}(4 - 3\sqrt{5}) \\
 &= 12\sqrt{3} - 9\sqrt{15}
 \end{aligned}$$

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More Multiplying:

Examples:

$$\begin{aligned}
 3) & -4\sqrt{15}(-\sqrt{3}) \\
 &= 4\sqrt{45} \\
 &= 12\sqrt{5}
 \end{aligned}$$

$$\begin{aligned}
 & 45 = 3 \cdot 3 \cdot 5 \\
 & \sqrt{45} = 3\sqrt{5} \\
 & 4 \cdot 3\sqrt{5} = 12\sqrt{5}
 \end{aligned}$$

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$$\begin{aligned}
 4) & (5 - 4\sqrt{5})(-2 + \sqrt{5}) \\
 &= -10 + 5\sqrt{5} + 8\sqrt{5} - 4\sqrt{25} \\
 &= -10 + 13\sqrt{5} - 20 \\
 &= -30 + 13\sqrt{5}
 \end{aligned}$$

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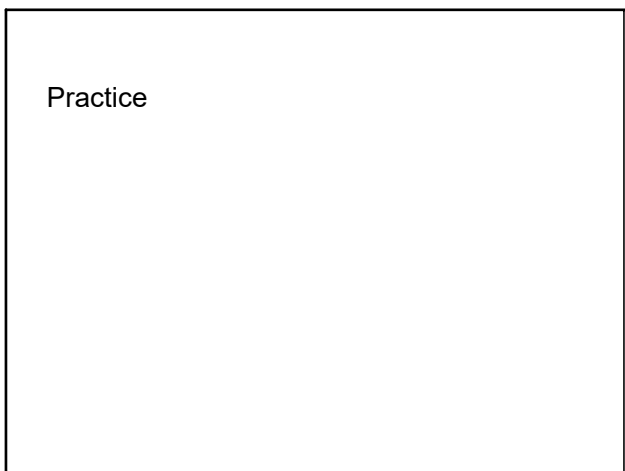
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You Try!!

5) $\sqrt{3}(-5\sqrt{10} + \sqrt{6})$

$$= -5\sqrt{30} + \sqrt{18}$$
$$= -5\sqrt{30} + \sqrt{3 \cdot 3 \cdot 2}$$
$$= -5\sqrt{30} + 3\sqrt{2}$$

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