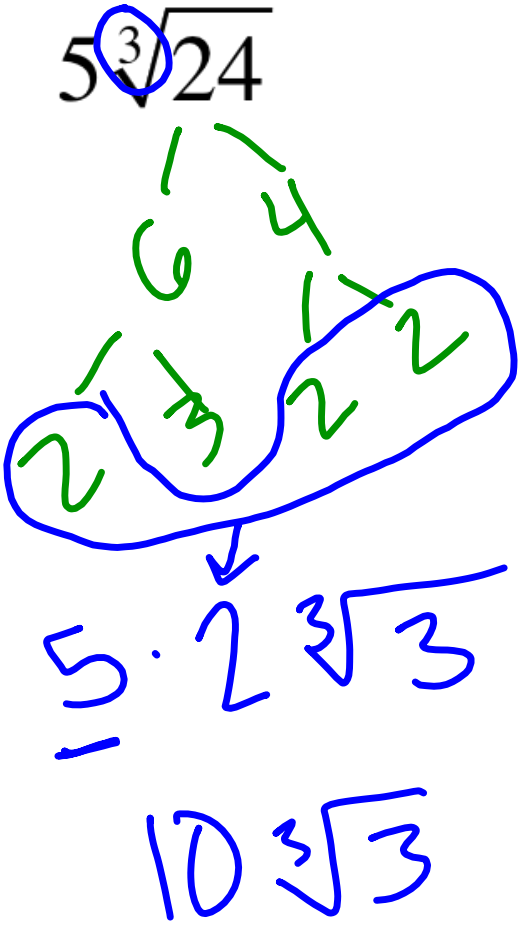
3-1 Simplifying Radicals

- I can simplify radicals
- I can perform operations with radicals
- I know and can convert between radicals and fractional exponents

Simplify

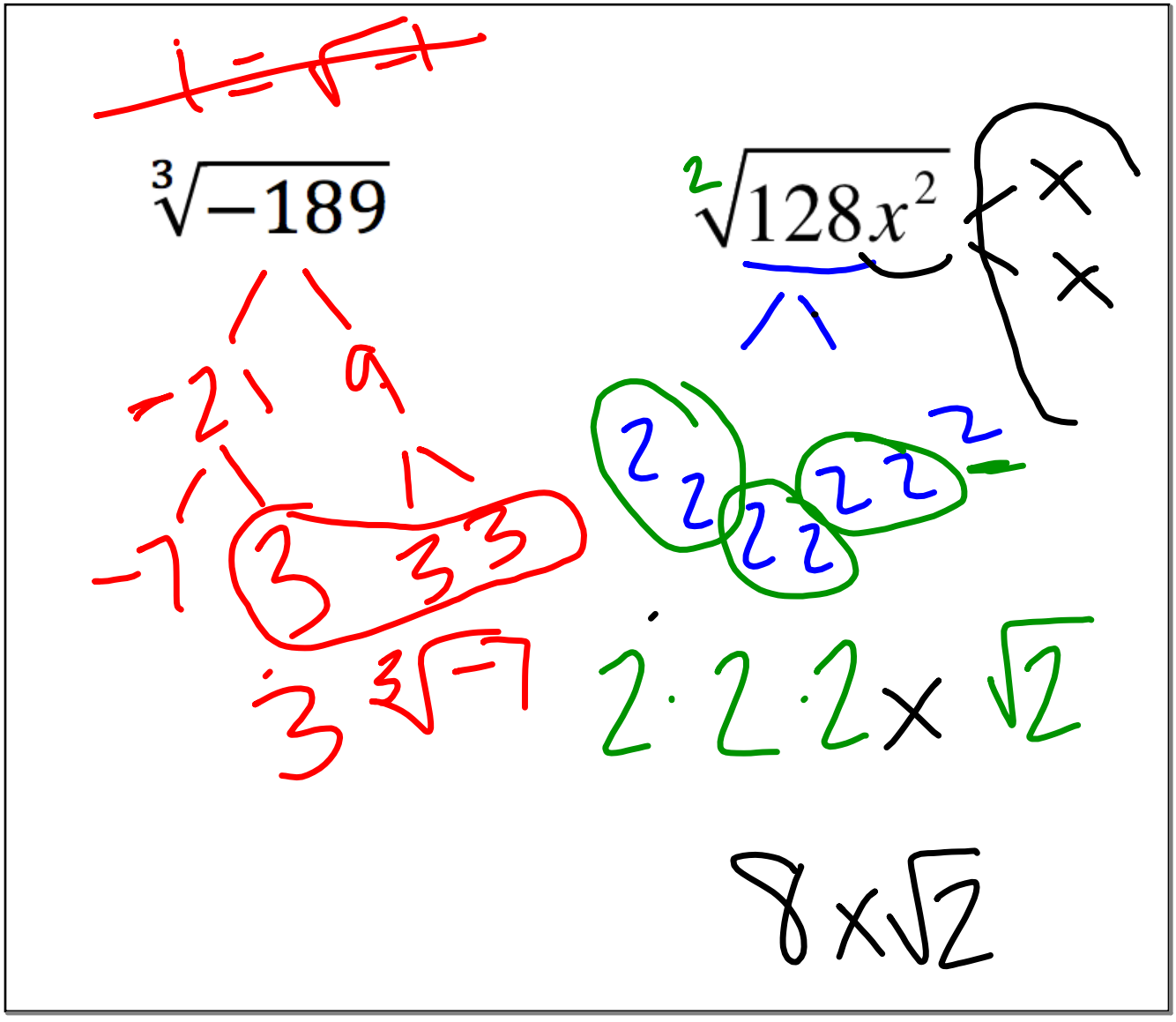
$5\sqrt[3]{24}$



$5 \cdot 2\sqrt[3]{3}$

$10\sqrt[3]{3}$

$\sqrt[4]{20}$


$\sqrt[3]{-189}$
$\sqrt[2]{128x^2}$
$3\sqrt[3]{-7}$
$2 \cdot 2 \cdot 2 \times \sqrt{2}$
$8\times\sqrt{2}$

$\sqrt[3]{128x^6y^{10}}$

$\sqrt[4]{16a^5b^{11}}$

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

$4x^2y^3\sqrt[3]{2y}$

$2ab^2$

Fractional exponent

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

$a^{\frac{1}{4}} = \sqrt[4]{a^1}$

n is an integer bigger than or equal to 2

$$a^{\left(\frac{2}{3}\right)} = \underline{\qquad}$$

$\left(\sqrt[3]{a}\right)^2$

$$a^{\left(\frac{m}{n}\right)} = \underline{\qquad}$$

Write each of the following as a radical and simplify, if possible.

$9^{\frac{1}{2}}$ $\quad 100^{\frac{1}{2}}$ $\quad -100^{\frac{1}{2}}$

$\sqrt{9} = 3$

Rewrite in exponent form

$\sqrt[7]{x} = x^{\frac{1}{7}}$ $\sqrt[4]{b} = b^{\frac{1}{4}}$

Adding, Subtracting, and Multiplying Radical expressions

Product Property of Radicals

If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers, and $n \geq 2$ is an integer, then

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$$

Multiply and Simplify Assuming all variables are greater than or equal to zero.

$\sqrt{3} \cdot \sqrt{15}$

$\sqrt{3 \cdot 15} = \sqrt{45}$

$3\sqrt[3]{4x} \cdot \sqrt[3]{2x^4}$

$3\sqrt[3]{8x^5}$

$\sqrt[4]{27a^2b^5} \cdot \sqrt[4]{6a^3b^6}$

$\sqrt{5}(4+\sqrt{10})$

$4\sqrt{5}+\sqrt{50}$

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

$\sqrt{75}+4\sqrt{45}$