WARMUP

Simplify:

$\sqrt{120x^7y^5}$

$120 = 2 \cdot 60$, $60 = 2 \cdot 30$, $30 = 2 \cdot 15$, $15 = 3 \cdot 5$

$\sqrt{4x^6y^4} \cdot \sqrt{30xy}$

perfect squares | leftovers

$2x^3y^2\sqrt{30xy}$

$\sqrt[3]{-108x^5y^9}$

$-108 = 2 \cdot 54$, $54 = 2 \cdot 27$, $27 = 3 \cdot 3 \cdot 3$

$\sqrt[3]{-27x^3y^9} \cdot \sqrt[3]{4x^2}$

perfect cubes | leftovers

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

$\sqrt[4]{16x^{11}y^{20}}$

$16 = 2 \cdot 8$, $8 = 2 \cdot 4$, $4 = 2 \cdot 2$

$\sqrt[4]{16x^8y^{20}} \cdot \sqrt[4]{x^3}$

$2x^2y^5 \cdot \sqrt[4]{x^3}$

Section 10.4

Properties:

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

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

ex: $\sqrt[6]{4x^3} \cdot \sqrt[6]{16x^7} = \sqrt[6]{64x^{10}} = \sqrt[6]{64x^6} \cdot \sqrt[6]{x^4}$

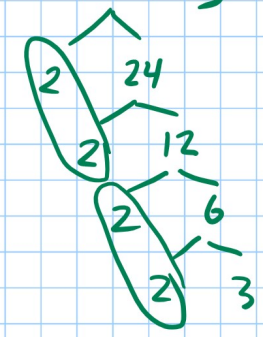
$4 \cdot 16$, $x^3 \cdot x^7$

$= 2x \cdot \sqrt[6]{x^4}$

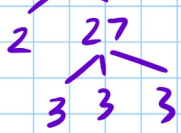
ex: $\sqrt{\frac{81}{16x}} \cdot \sqrt{\frac{16x^2}{81}} = \sqrt{\frac{81}{16x} \cdot \frac{16x^2}{81}} = \sqrt{x}$

ex: $\sqrt{12x} \cdot \sqrt{4y} = \sqrt{48xy} = 2 \cdot 2\sqrt{3xy}$

$= 4\sqrt{3xy}$



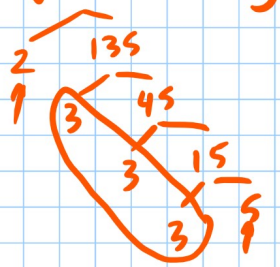
ex: $\sqrt[3]{18x^{15}y^2} \cdot \sqrt[3]{3x^7y^4} = \sqrt[3]{54x^{22}y^6}$



$= \sqrt[3]{27x^{21}y^6} \cdot \sqrt[3]{2x}$

$= 3x^7y^2 \cdot \sqrt[3]{2x}$

5) $\sqrt[3]{30x^{13}y} \cdot \sqrt[3]{9x^{16}y^{10}} = \sqrt[3]{270x^{29}y^{11}}$



quotient

$3\overline{)29}$ → 9

27

2 ← remainder

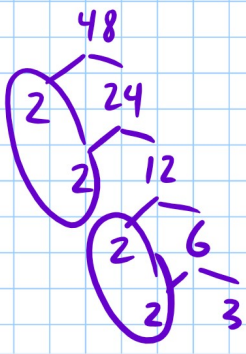
$3\overline{)11}$ → 3

9

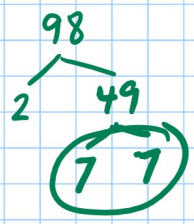
2

$3x^9y^3\sqrt[3]{10x^2y^2}$

ex: $\sqrt{\frac{48}{9}} = \frac{\sqrt{48}}{\sqrt{9}} = \frac{4\sqrt{3}}{3}$



ex: $\sqrt{\frac{98x^3y^2}{25}} = \frac{\sqrt{98x^3y^2}}{\sqrt{25}} = \frac{7xy\sqrt{2x}}{5}$



ex: $\frac{\sqrt{150}}{\sqrt{6}} = \sqrt{\frac{150}{6}} = \sqrt{25} = 5$

$\frac{x^a}{x^b} = x^{a-b}$

ex: $\frac{\sqrt[3]{80x^{15}y^6}}{\sqrt[3]{10x^2y}} = \sqrt[3]{8x^{13}y^5}$

$\frac{y^6}{y} = y^5$

$3\overline{)13}$ R 1 (4)

$3\overline{)5}$ R 2 (1)

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

remainder radical