Lesson 6.2

More Radical Stuff!

$(x^3)^2 = x^6$

Simplify:

1. $\sqrt{20x^7y^4}$

$\sqrt{4}\sqrt{5}\cdot\sqrt{x^6}\cdot\sqrt{x}\cdot\sqrt{y^4}$

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

$= 2x^3y^2\sqrt{5x}$

2. $\sqrt{32x^5y^3z^9}$

$\sqrt{16}\sqrt{2}\sqrt{x^4}\sqrt{x}\,\sqrt{y^2}\sqrt{y}\sqrt{z^8}\sqrt{z}$

$= 4\sqrt{2}\cdot x^2\sqrt{x}\;y\sqrt{y}\;z^4\sqrt{z}$

$= 4x^2yz^4\sqrt{2xyz}$

3. $\sqrt[3]{75x^5y^4z^2}$

$3\cdot5\cdot5$

$\sqrt[3]{75}\,\sqrt[3]{x^3}\cdot\sqrt[3]{x^2}\cdot\sqrt[3]{y^3}\cdot\sqrt[3]{y}\,\sqrt[3]{z^2}$

$= \sqrt[3]{75}\times\sqrt[3]{x^2}\cdot y\sqrt[3]{y}\cdot\sqrt[3]{z^2}$

$= xy\sqrt[3]{75x^2yz^2}$

4. $\sqrt[3]{-8x^9y^6}$ $= -2x^3y^2$

5. $\sqrt[4]{32x^7y^{10}}$

$\sqrt[4]{16\cdot2\cdot x^4\cdot x^3\cdot y^8\cdot y^2}$

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

6. $\sqrt[5]{-64x^4y^{12}}$

$\sqrt[5]{-32\cdot2\cdot x^4\,y^{10}\cdot y^2}$

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

7. $\sqrt{-5} \cdot \sqrt{10}$

$= \sqrt{-50}$

$= \sqrt{(-1)(25)(2)}$

$\sqrt{-1}\ \sqrt{25}\ \sqrt{2}$

$= i \cdot 5\sqrt{2}$

$= 5i\sqrt{2}$

8. $\sqrt{6x^7y^4} \cdot \sqrt{3xy^4}$

$= \sqrt{18x^8y^8}$

$= \sqrt{9}\sqrt{2}\sqrt[2]{x^8}\sqrt{y^8}$

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

$= \boxed{3x^4y^4\sqrt{2}}$

9. $-\sqrt[3]{2x^3y^2} \cdot 4\sqrt[3]{12x^4y^4}$

$-4\sqrt[3]{24x^7y^6} = -4\sqrt[3]{8 \cdot 3x^6 \cdot x \cdot y^6}$

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

$= \boxed{-8x^2y^2\sqrt[3]{3x}}$

10. $\dfrac{\sqrt{5x^5y^2}}{\sqrt{3x^2y^5}} = \sqrt{\dfrac{5x^5y^2}{3x^2y^5}}$

$= \sqrt{\dfrac{5x^3}{3y^3}} = \sqrt{\dfrac{5(x^2)x}{3(y^2)\cdot y}}$

$= \dfrac{x}{y}\sqrt{\dfrac{5x}{3y}\cdot\dfrac{\sqrt{3y}}{\sqrt{3y}}}$

$= \dfrac{x}{y}\dfrac{\sqrt{15xy}}{3y} = \boxed{\dfrac{x\sqrt{15xy}}{3y^2}}$