Roots and Powers

Key Ideas:

1. **Estimating roots / Irrational numbers**

2. **Mixed / Entire radicals**

   - **(squares and cubes)**

3. **Gr. 9 Exponent Laws:**

   - **when multiplying common bases, ADD exponents**
   - **when dividing common bases, SUBTRACT exponents**
   - **when you have a power of a power, MULTIPLY exponents**
   - **anything to the power of zero is "1"**

4. **Negative Exponent Law**

   - **"flip and fly"**

5. **Fractional Exponent Law**

   - **change to a radical**

***Note: Watch your positive and negative signs!! Always simplify!**

1. Change to a ***mixed radical***: $\sqrt{80}$

2. Change to an ***entire radical***: $4\sqrt[3]{5}$

3. Simplify:

a) $(x^4x^{-9})^{-3}x^0$

b) $\left(\frac{x^{-5}y^3}{x^{-8}y}\right)^2$

4. Evaluate:

a) 3^{-4}

b) $\frac{1}{4^{-2}}$

5. Simplify:

a) $\left(\frac{4x}{6y}\right)^{-2}$

b) $(2x^2y^{-4})^{-3}$

6. Evaluate:

a) $4^{\frac{1}{2}}$

b) $64^{\frac{5}{6}}$

c) $\left(\frac{8}{27}\right)^{\frac{1}{3}}$

d) $(25x^3y^6)^{\frac{1}{2}}$

7. Evaluate:

a) $\left(\frac{4x^6}{6x^{-2}}\right)^{-3}$

b) $(3x^{-4}y^2)^{-2}$

c) $\left(\frac{25x^{-2}y^3}{16x^{-4}y^{-1}}\right)^{\frac{-3}{2}}$

d) $(4x^{-2}y)^2(2x^3y^{-2})^{-3}$