**LT #1: Roots & Radical Expressions**

Simplify the expression without the use of a calculator. Write answers
with positive exponents only. (2 pts each)

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. $5^{-2}$ 2. $\sqrt[4]{32x^{6}y^{8}z^{14}}$ 3. $(3x^{3}y^{6})^{2}$

4. $\sqrt[3]{-27x^{4}y^{9}}$ 5. $(3^{\frac{1}{2}}∙4^{\frac{1}{2}})^{2}$ 6. $\sqrt[5]{64x^{12}y^{10}}$

7. $\left(\frac{2x^{-3}y^{6}}{3x^{7}y^{-1}}\right)^{-2}$ 8. $\frac{(3xy^{-3})^{2}}{4(x^{5}y^{-2})^{3}}$ 9. $2a^{3}\left(3a^{2}\right)^{2}(a^{-3})^{-1}$

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**LT #2: Multiplying & Dividing Radicals**
Simplify the following expressions. Assume variables represent positive
numbers only. Rationalize the denominator if necessary. (3 pts each)

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 1. $\sqrt[3]{9x^{4}y^{2}}∙\sqrt[3]{9x^{7}y^{2}z}$ 2. $\frac{\sqrt[4]{32x^{9}y^{5}z^{8}}}{\sqrt[4]{2yz^{2}}}$

 3. $ \frac{\sqrt[3]{5x}}{\sqrt[3]{2y^{2}}}$

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**LT #3: Binomial Radical Expressions**
Simplify the following expressions. (2 pts each)

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. $ \sqrt{48}+2\sqrt{18}-3\sqrt{27}$ 2. $(2+3\sqrt{2})(5-4\sqrt{2})$

3. $\left(1-\sqrt{6}\right)-(3+7\sqrt{6})$ 4. $\frac{5}{3+\sqrt{5}}$

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