Name: _____ Per: _____ Date: _____

**Directions** - *(N.RN.1) Given the following expressions, expand the base, simplify the expression, and explain the simplification.*

1. Original   =   Expanded   =   Simplified

   $512^{\frac{2}{3}}$   $= ($                    $)^{\frac{2}{3}} = $ _____

   Explanation: The simplified expression is _____ of the _____ repeated factors resulting in a product

   of _____.

2. $256^{\frac{1}{4}}$   $= ($                    $)^{\frac{1}{4}} = $ _____

   Explanation: The simplified expression is _____

   _____.

3. $81^{\frac{3}{4}}$   $= ($                    $)^{\frac{3}{4}} = $ _____

   Explanation: The simplified expression is _____

   _____.

4. $3125^{\frac{2}{5}}$   $= ($                    $)^{\frac{2}{5}} = $ _____

   Explanation: The simplified expression is _____

   _____.

**Directions** - *(N.RN.1) Explain why the two expressions are equivalent, showing the steps for simplification.*

Example: $\quad \sqrt[6]{4^3} \quad = \quad \left(\sqrt[6]{4}\right)^3$

$\qquad\qquad \sqrt[6]{64} \quad = \quad (1.2599)^3 \quad \leftarrow$ Calculator used for the 6$^{th}$ root of 4

$\qquad\qquad 2 \qquad = \quad 2$

5. $\sqrt[4]{16^2} \quad = \quad \left(\sqrt[4]{16}\right)^2$

6. $\sqrt[3]{27^4} \quad = \quad \left(\sqrt[3]{27}\right)^4$

7. $\sqrt[3]{8^3} \quad = \quad \left(\sqrt[3]{8}\right)^3$

8. $\sqrt{9^3} \quad = \quad \left(\sqrt{9}\right)^3$

9. $\sqrt[3]{216^2} \quad = \quad \left(\sqrt[3]{216}\right)^2$