N.RN.1

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Practice

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

1.   Original   =   Expanded   =   Simplified

$\sqrt[3]{512}^2$ = $512^{\frac{2}{3}}$   $= (\,8 \cdot 8 \cdot 8\,)^{\frac{2}{3}} = 8 \cdot 8 = 8^2 = \boxed{64}$

Explanation: The simplified expression is __2__ of the __3__ repeated factors resulting in a product of the __512__.

2.   $256^{\frac{1}{4}}$   $= (\,4 \cdot 4 \cdot 4 \cdot 4\,)^{\frac{1}{4}} = 4^1 = \boxed{4}$

Explanation: The simplified expression is _1 of 4 repeated factors of the product of 256._

3.   $81^{\frac{3}{4}}$   $= (\,3 \cdot 3 \cdot 3 \cdot 3\,)^{\frac{3}{4}} = 3^2 = \boxed{27}$

Explanation: The simplified expression is _3 out of 4 repeated factors of the product of 81._

4.   $3125^{\frac{2}{5}}$   $= (\,5 \cdot 5 \cdot 5 \cdot 5 \cdot 5\,)^{\frac{2}{5}} = 5^2 = \boxed{25}$

Explanation: The simplified expression is _2 out of 5 repeated factors of the product of 3125._

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

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

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

$2$  $=$  $2$

$1st\ Exp$  $\qquad$  $1st\ Root$

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

$\sqrt[4]{256}$  $=$  $(2)^2$

$4$  $=$  $4$  ✓

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

$\sqrt[3]{531441}$  $=$  $(3)^4$  ✓

$81$  $=$  $81$  ✓

7.  $\sqrt[3]{8^3}$  $=$  $\left(\sqrt[3]{8}\right)^3$  $= 8^{\frac{3}{3}} = 8^1 = 8$

$\sqrt[3]{512}$  $=$  $(2)^3$  ✓

$8$  $=$  $8$  ✓

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

$\sqrt{729}$  $=$  $(3)^3$  ✓

$27$  $=$  $27$ ✓

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

$\sqrt[3]{46656}$  $=$  $(6)^2$  ✓

$36$  $=$  $36$  ✓