Name: _____

N.RN.A.1: Radicals and Rational Exponents

1 Explain why $81^{\frac{3}{4}}$ equals 27.

2 Explain how $(-8)^{\frac{4}{3}}$ can be evaluated using properties of rational exponents to result in an integer answer.

3 Explain how $\left(3^{\frac{1}{5}}\right)^2$ can be written as the equivalent radical expression $\sqrt[5]{9}$.

4 Explain what a rational exponent, such as $\frac{5}{2}$ means. Use this explanation to evaluate $9^{\frac{5}{2}}$.

N.RN.A.1: Radicals and Rational Exponents
Answer Section

1 ANS:
The denominator of the rational exponent represents the index of a root, and the 4th root of 81 is 3 and 3^3 is 27.

REF: 011832aii

2 ANS:
Rewrite $\frac{4}{3}$ as $\frac{1}{3} \cdot \frac{4}{1}$, using the power of a power rule.

REF: 081725aii

3 ANS:
Applying the commutative property, $\left(3^{\frac{1}{5}}\right)^2$ can be rewritten as $\left(3^2\right)^{\frac{1}{5}}$ or $9^{\frac{1}{5}}$. A fractional exponent can be rewritten as a radical with the denominator as the index, or $9^{\frac{1}{5}} = \sqrt[5]{9}$.

REF: 081626aii

4 ANS:
The denominator of the rational exponent represents the index of a root, and the numerator of the rational exponent represents the power of the base. $\left(\sqrt{9}\right)^5 = 243$

REF: 081926aii