15.2 – Simplifying Rational Exponents

In a fractional exponent, the denominator of the fraction tells you which root to take and the numerator tells you which power to raise it to.

Rewrite each expression using rational (fractional) exponents.

1. $\sqrt{8} =$ $8^{\frac{1}{2}}$

2. $\sqrt[3]{5^8} =$ $5^{\frac{8}{3}}$

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

Rewrite each expression using radical notation.

4. $4^{\frac{1}{5}} =$ $\sqrt[5]{4}$

5. $16^{\frac{5}{3}} =$ $\sqrt[3]{16^5}$ OR $\left(\sqrt[3]{16}\right)^5$

6. $5^{\frac{3}{4}} =$ $\left(\sqrt[4]{5}\right)^3$ OR $\sqrt[4]{5^3}$

Evaluate each expression by rewriting in radical notation.

7. $4^{\frac{3}{2}} =$ $\left(\sqrt{4}\right)^3 = 2^3 = 8$

8. $9^{\frac{1}{2}} =$ $\sqrt{9} = 3$

9. $8^{\frac{2}{3}} =$ $\left(\sqrt[3]{8}\right)^2 = 2^2 = 4$

10. $32^{\frac{3}{5}} =$ $\left(\sqrt[5]{32}\right)^3 = 2^3 = 8$