

Functions & Trig.  
Rational Exponents

Name \_\_\_\_\_

Rewrite the expression using rational exponent notation.

1.)  $\sqrt{x^1} = x^{\frac{1}{2}}$  (power 1, root 2)

2.)  $\sqrt[3]{x} = x^{\frac{1}{3}}$

3.)  $\sqrt[3]{x^2} = x^{\frac{2}{3}}$

4.)  $(\sqrt{xy})^5 = (xy)^{\frac{1}{2} \cdot 5}$   
 $= (xy)^{\frac{5}{2}}$   
 $= x^{\frac{5}{2}} y^{\frac{5}{2}}$

5.)  $y \sqrt[11]{z^6} = y z^{\frac{6}{11}}$

6.)  $\sqrt[4]{xy^3} = x^{\frac{1}{4}} y^{\frac{3}{4}}$

7.) When  $b > 0$  and  $d$  is a positive integer, the expression  $(\sqrt[d]{3b})^2$  is equivalent to

(A)  $(3b)^{\frac{d}{2}}$

(B)  $3b^{\frac{2}{d}}$

(C)  $3b^{\frac{d}{2}}$

(D)  $(3b)^{\frac{2}{d}}$

$(3b)^{\frac{1}{d} \cdot 2}$

$(3b)^{\frac{2}{d}}$

Rewrite the expression using radical notation.

$$8.) x^{\frac{3}{4}} = \sqrt[4]{x^3}$$

$$9.) x^{\frac{1}{7}} = \sqrt[7]{x}$$

$$10.) x^{\frac{2}{5}} = \sqrt[5]{x^2}$$

$$11.) 5x^{\frac{1}{2}} = 5\sqrt{x}$$

$$12.) (5x)^{\frac{1}{2}} = \sqrt{5x}$$

$$13.) (xz)^{\frac{4}{3}} = \left(\sqrt[3]{xz}\right)^4$$
$$= \sqrt[3]{x^4z^4} \quad \text{or}$$
$$= \sqrt[3]{(xz)^4}$$

Perfect Cubes

$$2^3 = 8$$

$$3^3 = 27$$

$$4^3 = 64$$

$$5^3 = 125$$

Perfect Quartics

$$2^4 = 16$$

$$3^4 = 81$$

$$4^4 = 256$$

Perfect Quintics

$$2^5 = 32$$

$$3^5 = 243$$

Simplify the expression without a calculator.

$$14.) \sqrt[3]{27} = \boxed{3}$$

$$15.) 81^{\frac{5}{4}} = \sqrt[4]{81^5}$$
$$= 3^5 = \boxed{243}$$

$$16.) 32^{\frac{2}{5}} = \sqrt[5]{32^2}$$
$$= 2^2 = \boxed{4}$$

$$17.) \sqrt[4]{16} = \boxed{2}$$