

NAME: \_\_\_\_\_

Key

## SIMPLIFYING EXPONENTS/RADICALS

SIMPLIFY. YOUR ANSWER SHOULD CONTAIN ONLY POSITIVE EXPONENTS.

$$1. (x^{-2} x^{-3})^4$$

$$\frac{1}{x^{20}}$$

$$2. (x^4)^{-3} \cdot 2x^4$$

$$\frac{2}{x^8}$$

$$3. (216x^9)^{\frac{1}{3}}$$

$$6x^3$$

$$4. \frac{x^3 y^3 \cdot x^3}{4x^2}$$

$$\frac{x^4 y^3}{4}$$

$$5. \frac{2x^{-4}}{(2x^{-4})^3}$$

$$\frac{x^8}{4}$$

$$6. \frac{2y^3 \cdot 3xy^3}{3x^2 y^4}$$

$$\frac{2y^2}{x}$$

$$7. (2x^0 y^2)^{-3} \cdot 2yx^3$$

$$\frac{2yx^3}{8y^6} = \frac{x^3}{4y^5}$$

$$8. (x^{-3} y^{-3})^0$$

$$1$$

$$9. (x^3)^3 \cdot 2n^{-1}$$

$$\frac{2x^9}{n}$$

$$10. \frac{x}{(2x^0)^2}$$

$$\frac{x}{4}$$

$$11. \frac{(2xy^{-1}z^0)^{-4} \cdot 2x^3 y^{-1}}{2xz^2}$$

$$\frac{2y^4 x^3}{16x^4 y \cdot 2xz^2} = \frac{y^3}{16x^2 z^2}$$

$$12. \frac{(2xy^2 z^{-2} \cdot x^2 y^{-3})^0}{2x^{-3} y^{-4} z^{-1}}$$

$$\frac{x^3 y^4 z}{2}$$

SIMPLIFY. ALL ANSWERS SHOULD BE IN RADICAL FORM.

13.  $\sqrt[3]{-162}$   
 ~~$\sqrt[3]{-162}$~~   $\sqrt[3]{-27 \cdot 6}$   
 $-3\sqrt[3]{6}$

14.  $\sqrt{98k}$   
 $\sqrt{49} \sqrt{2k}$   
 $7\sqrt{2k}$

15.  $\sqrt{512x^2}$   
 $\sqrt{256x^2} \sqrt{2}$   
 $16x\sqrt{2}$

16.  $\sqrt[6]{488x^7y^7}$   
 $xy \sqrt[6]{488xy}$

17.  $\sqrt[4]{405x^3y^5}$   
 $\sqrt[4]{81y^4} \sqrt[4]{5x^3y}$   
 $3y \sqrt[4]{5x^3y}$

18.  $\sqrt[4]{-16 \cdot -81}$   
 $6$

19.  $(2x^2 \cdot 4y)^{1/2}$   
 $\sqrt{8x^2y}$   
 $2x\sqrt{2y}$

20.  $2x^2 \cdot 3y^{3/2} \cdot 4x^{-2}$   
 ~~$24y\sqrt{y}$~~   
 $24y\sqrt{y}$

21.  $(a)^{4/5}$   
 $\sqrt[5]{a^4}$

22.  $\frac{2x^{-3/4}}{4x^{4/3}}$

$$\frac{1}{2^{12}\sqrt{x^{37}}} = \frac{1}{2x^{312}\sqrt{x}} \cdot \frac{\sqrt[12]{x^{11}}}{\sqrt[12]{x^{11}}} = \frac{\sqrt[12]{x^{11}}}{2x^4}$$

23.  $\frac{4x^2}{2x^{1/2}}$

$$2x^{3/2} = 2x\sqrt{x}$$

24.  $3x^{1/2} \cdot x^{4/3}$

$$3^6 \sqrt{x^{11}} =$$

$$3x^6 \sqrt{x^5}$$

MULTIPLY OR RATIONALIZE THE DENOMINATOR.

25.  $(\sqrt{x}-3)(\sqrt{x}+3)$   
 $x-9$

26.  $\sqrt{x}(\sqrt{x}+\sqrt{y})$   
 $x+\sqrt{xy}$

27.  $(\sqrt{x}+\sqrt{y})(3\sqrt{x}-2\sqrt{y})$   
 $3x+\sqrt{xy}-2y$

28.  $\frac{8}{\sqrt{x}}$

$\frac{8\sqrt{x}}{x}$

29.  $\sqrt[4]{\frac{4}{x^3}}$

$\frac{\sqrt[4]{4} \cdot \sqrt[4]{x^3}}{\sqrt[4]{x^3} \cdot \sqrt[4]{x^3}} = \frac{\sqrt[4]{4x}}{x}$

30.  $\frac{2}{\sqrt{x}+\sqrt{y}} \cdot \frac{\sqrt{x}-\sqrt{y}}{\sqrt{x}-\sqrt{y}}$

$\frac{2(\sqrt{x}-\sqrt{y})}{x-y}$

31. SIMPLIFY:  $\sqrt[n]{3 \cdot 2^n \cdot x^{2n} \cdot y^{n+3}}$   
 Think of division of exponents with remainder  
 $2x^2y \sqrt[n]{3y^3}$

32. WHAT SIMPLIFIES INTO  $2xy^2 \sqrt[3]{5xy^2}$ ?  
 $\begin{matrix} \downarrow & \downarrow & \downarrow \\ 2^2 & x^3 & y^6 \end{matrix}$   
 $\sqrt[3]{40x^4y^8}$

33. WHY IS  $X^0$  EQUAL TO 1?

$\frac{X^4}{X^4} = X^{4-4} = X^0 = 1$

34. WHY DOES  $0^0$  NOT EXIST?

$\frac{0^4}{0^4} = \frac{0}{0}$  DNE

you can not multiply a number by itself and get a negative

35. WHY IS IT IMPOSSIBLE TO TAKE THE SQUARE ROOT OF A NEGATIVE NUMBER?