

Simplifying Rational Exponents

Date _____ Period _____

Simplify. put in absolute values where needed

1) $(n^4)^{\frac{3}{2}}$

2) $(27p^6)^{\frac{5}{3}}$

3) $(25b^6)^{-1.5}$

4) $(64m^4)^{\frac{3}{2}}$

5) $(a^8)^{\frac{3}{2}}$

6) $(9r^4)^{0.5}$

7) $(81x^{12})^{1.25}$

8) $(216r^9)^{\frac{1}{3}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator. Identify domain + which term causes the restriction

9) $2m^2 \cdot 4m^{\frac{3}{2}} \cdot 4m^{-2}$

10) $3b^{\frac{1}{2}} \cdot b^{\frac{4}{3}}$

11) $\left(p^{\frac{3}{2}}\right)^{-2}$

12) $\left(a^{\frac{1}{2}}\right)^{\frac{3}{2}}$

13) $\frac{2x^{-\frac{7}{4}}}{4x^{\frac{4}{3}}}$

14) $\frac{4x^2}{2x^{\frac{1}{2}}}$

$$15) \frac{3x^{-\frac{1}{2}} \cdot 3x^{\frac{1}{2}} y^{-\frac{1}{3}}}{3y^{-\frac{7}{4}}}$$

$$16) \frac{3y^{\frac{1}{4}}}{4x^{-\frac{2}{3}} y^{\frac{3}{2}} \cdot 3y^{\frac{1}{2}}}$$

$$17) \left(m \cdot m^{-2} n^{\frac{5}{3}}\right)^2$$

$$18) \left(a^{-1} b^{\frac{1}{3}} \cdot a^{-\frac{4}{3}} b^2\right)^2$$

$$19) \left(\frac{x^{\frac{1}{2}} y^{-2}}{yx^{\frac{7}{4}}}\right)^4$$

$$20) \frac{(x^3 y^2)^{\frac{3}{2}}}{\left(x^{-1} y^{-\frac{2}{3}}\right)^4}$$

$$21) \frac{\left(x^{-\frac{1}{2}} y^2\right)^{-\frac{5}{4}}}{x^2 y^{\frac{1}{2}}}$$

$$22) \frac{\left(x^{-\frac{1}{2}} y^4\right)^{\frac{1}{4}}}{x^{\frac{2}{3}} y^{\frac{3}{2}} \cdot x^{-\frac{3}{2}} y^{\frac{1}{2}}}$$

Simplifying Rational Exponents

Simplify.

$$1) (n^4)^{\frac{3}{2}}$$

$$n^6$$

$$2) (27p^6)^{\frac{5}{3}}$$

$$243p^{10}$$

$$3) (25b^6)^{-1.5}$$

$$\frac{1}{125b^9}$$

$$4) (64m^4)^{\frac{3}{2}}$$

$$512m^6$$

$$5) (a^8)^{\frac{3}{2}}$$

$$a^{12}$$

$$6) (9r^4)^{0.5}$$

$$3r^2$$

$$7) (81x^{12})^{1.25}$$

$$243x^{15}$$

$$8) (216r^9)^{\frac{1}{3}}$$

$$6r^3$$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

$$9) 2m^2 \cdot 4m^{\frac{3}{2}} \cdot 4m^{-2}$$

$$32m^{\frac{3}{2}} \quad m > 0$$

$$10) 3b^{\frac{1}{2}} \cdot b^{\frac{4}{3}}$$

$$3b^{\frac{11}{6}} \quad b > 0$$

$$11) \left(\frac{3}{p^2}\right)^{-2}$$

$$\frac{1}{p^3} \quad p > 0$$

$$12) \left(\frac{1}{a^2}\right)^{\frac{3}{2}}$$

$$\frac{3}{a^4} \quad a > 0$$

$$13) \frac{2x^{\frac{7}{4}}}{4x^{\frac{4}{3}}}$$

$$\frac{x^{\frac{11}{12}}}{2x^{\frac{4}{3}}} = 2x^{\frac{37}{12}}$$

$$14) \frac{4x^2}{2x^{\frac{1}{2}}}$$

$$2x^{\frac{3}{2}} \quad x > 0$$

$$15) \frac{3x^{\frac{1}{2}} \cdot 3x^{\frac{1}{2}} y^{-\frac{1}{3}}}{3y^{\frac{7}{4}}} \rightarrow x, y > 0$$

$$3y^{\frac{17}{12}}$$

$$16) \frac{3y^{\frac{1}{4}}}{4x^{-\frac{2}{3}} \cdot 3y^{\frac{1}{2}}} = \frac{x^{\frac{2}{3}}}{4y^{\frac{7}{4}}}$$

$y > 0$
 x can be negative
 $x \neq 0$

$$17) (m \cdot m^{-2} n^{\frac{5}{3}})^2$$

$$\frac{n^{\frac{10}{3}}}{m^2}$$

both m and n
 can be neg
 $m \neq 0$

$$18) (a^{-1} b^{\frac{1}{3}} \cdot a^{-\frac{4}{3}} b^2)^2$$

$$\frac{a^{\frac{1}{3}} b^{\frac{14}{3}}}{a^5} = \frac{b^{\frac{14}{3}}}{a^{\frac{14}{3}}}$$

both a
 and b
 can be
 neg
 $a \neq 0$

$$19) \left(\frac{x^{\frac{1}{2}} y^{-2}}{yx^{\frac{7}{4}}} \right)^4 \rightarrow x > 0, y \neq 0$$

$$\frac{x^9}{y^{12}} \rightarrow \text{no need for abs value}$$

since $x^{\frac{1}{2}}$ means
 $x > 0$ to begin with

$$20) \frac{(x^3 y^2)^{\frac{3}{2}}}{(x^{-1} y^{-\frac{2}{3}})^{\frac{1}{4}}} \rightarrow x, y > 0$$

$$\frac{y^{\frac{19}{6}} x^{\frac{19}{4}}}{y^{\frac{19}{6}} x^{\frac{19}{4}}}$$

$$21) \frac{(x^{\frac{1}{2}} y^2)^{-\frac{5}{4}}}{x^2 y^{\frac{1}{2}}} = \frac{1}{y^3 x^{\frac{11}{8}}}$$

$$\frac{x^{\frac{5}{8}}}{y^3 x^2}$$

$x, y > 0$

$$22) \frac{(x^{\frac{1}{2}} y^4)^{\frac{1}{4}}}{x^{\frac{2}{3}} y^{\frac{3}{2}} \cdot x^{\frac{3}{2}} y^{\frac{1}{2}}} = \frac{x^{\frac{17}{24}}}{y}$$

$x, y > 0$