

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) $2m^2 \cdot 4m^{\frac{3}{2}} \cdot 4m^{-2}$
 $32m^{\frac{3}{2}}$ $m > 0$

10) $3b^{\frac{1}{2}} \cdot b^{\frac{4}{3}}$
 $3b^{\frac{11}{6}}$ $b > 0$

11) $(p^{\frac{3}{2}})^{-2}$
 $\frac{1}{p^3}$ $p > 0$

12) $(a^{\frac{1}{2}})^{\frac{3}{2}}$
 $a^{\frac{3}{4}}$ $a > 0$

13) $\frac{2x^{\frac{7}{4}}}{4x^{\frac{4}{3}}}$ $x > 0$
 $\frac{x^{\frac{11}{12}}}{2x^4} = 2x^{\frac{57}{12}}$

14) $\frac{4x^2}{2x^{\frac{1}{2}}}$
 $2x^{\frac{3}{2}}$ $x > 0$

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

$x, y > 0$

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

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

$$\frac{x^{\frac{2}{3}}}{4y^{\frac{7}{4}}}$$

$y > 0$
 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
 $m \neq 0$

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

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

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

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

$x > 0, y \neq 0$

$$\frac{x^9}{y^{12}}$$

no need for abs value
 since $x^{\frac{1}{2}}$ means
 $x > 0$ to begin with

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

$x, y > 0$

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

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

$$\frac{x^{\frac{5}{8}}}{y^3 x^{\frac{11}{8}}}$$

$x, y > 0$

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

$$\frac{x^{\frac{17}{24}}}{y}$$

$x, y > 0$