

Simplifying Rational Exponents

Simplify.

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

n^6

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

$243p^{10}$

$27^{5/3} p^{10}$

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

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

$\frac{1}{25^{3/2} b^9}$

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

$512m^6$

$64^{3/2} m^6$

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

a^{12}

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

$3r^2$

$9^{1/2} r^2$

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

$243x^{15}$

$81^{5/4} x^{15}$

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

$6r^3$

$216^{1/3} r^3$

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

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

$32m^{\frac{3}{2}}$

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

$3b^{\frac{11}{6}}$

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

$\frac{1}{p^3}$

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

$\frac{3}{a^4}$

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

$$\frac{1}{2} \times \frac{-37/12}{37/12} = \frac{1}{2x}$$

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

$$2x^{\frac{3}{2}}$$

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\frac{1}{y^3 x^{\frac{11}{4}}}$$

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

$$\frac{17}{x^{\frac{24}{3}} y}$$