

Simplify each expression. Leave your answer in exponent form.

1)  $y^{\frac{2}{5}} \cdot y^{\frac{3}{10}}$

$$y^{\frac{2 \cdot 2}{5 \cdot 2} + \frac{3}{10}}$$

$$y^{\frac{4}{10} + \frac{3}{10}}$$

$$y^{\frac{7}{10}}$$

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

$$a^{-1+3} b^{\frac{1}{2} + \frac{2}{3}}$$

$$a^2 b^{\frac{3}{6} + \frac{4}{6}}$$

$$a^2 b^{\frac{7}{6}}$$

3)  $(-3a^{-\frac{2}{3}})(5a^{-\frac{1}{3}})$

$$-15a^{-\frac{2}{3} + -\frac{1}{3}}$$

$$-15a^{-\frac{3}{3}} = -15a^{-1}$$

$$\frac{-15}{a}$$

4)  $(2a^{\frac{1}{4}})^2$

$$2^2 a^{\frac{1}{4} \cdot 2}$$

$$4a^{\frac{2}{4}}$$

$$4a^{\frac{1}{2}}$$

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

$$m^{2 \cdot \frac{3}{4}} n^{3 \cdot \frac{3}{4}}$$

$$m^{\frac{6}{4}} n^{\frac{9}{4}}$$

$$m^{\frac{3}{2}} n^{\frac{9}{4}}$$

6)  $(9x^4y^{-2})^{-\frac{1}{2}}$

$$9^{-\frac{1}{2}} x^{4 \cdot -\frac{1}{2}} y^{-2 \cdot -\frac{1}{2}}$$

$$3^{-1} x^{-4/2} y^{2/2} = \frac{y}{3x^2}$$

7)  $\frac{a^{-\frac{1}{3}}}{\frac{5}{a^6}}$

$$a^{-\frac{1 \cdot 2}{3 \cdot 2} + \frac{5}{6}}$$

$$a^{-\frac{2}{6} + \frac{5}{6}} = a^{-\frac{7}{6}}$$

$$\frac{1}{a^{\frac{7}{6}}}$$

8)  $\frac{-24x^{\frac{1}{5}}}{4x^{-\frac{3}{10}}}$

$$\frac{-24}{4} x^{\frac{1}{5} - -\frac{3}{10}}$$

$$-6x^{\frac{2}{10} + \frac{3}{10}}$$

$$-6x^{\frac{5}{10}}$$

$$-6x^{\frac{1}{2}}$$

9)  $\frac{5a^{\frac{3}{4}}b^{\frac{1}{2}}}{10a^{\frac{1}{3}}b^{\frac{1}{2}}}$

$$\frac{5}{10} a^{\frac{3}{4} - \frac{1}{3}} b^{\frac{1}{2} - \frac{1}{2}}$$

$$\frac{1}{2} a^{\frac{9}{12} - \frac{4}{12}}$$

$$\frac{1}{2} a^{\frac{5}{12}} \text{ or } \frac{a^{\frac{5}{12}}}{2}$$

10)  $\left(\frac{81y^{16}}{16x^{12}}\right)^{\frac{1}{2}}$

$$\frac{81^{\frac{1}{2}} y^{16 \cdot \frac{1}{2}}}{16^{\frac{1}{2}} x^{12 \cdot \frac{1}{2}}}$$

$$\frac{9y^8}{4x^6}$$

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

$$a^{\frac{4}{3}} \cdot a^{\frac{15}{3}}$$

$$a^{\frac{19}{3}}$$

12)  $\left(\frac{x^{\frac{1}{4}}}{x^{-\frac{3}{4}}}\right)^{-8}$

$$\frac{x^{\frac{1}{4} \cdot -8}}{x^{-\frac{3}{4} \cdot -8}} = \frac{x^{-2}}{x^6}$$

$$x^{-2-6} = x^{-8}$$

$$\frac{1}{x^8}$$