

Simplifying Rational Exponents

Honors Advanced Algebra

Name: _____

Period: _____ Date: _____

→ No negative exponents. No fractional exponents in denominator.

Simplify each expression. Please show work on a separate sheet of paper.

1. $c^{\frac{12}{5}} \cdot c^{\frac{3}{5}}$

2. $m^{\frac{2}{9}} \cdot m^{\frac{16}{9}}$

3. $(q^2)^{\frac{3}{2}}$

4. $p^{-\frac{1}{5}}$

5. $x^{-\frac{6}{11}}$

6. $\frac{x^{\frac{2}{3}}}{x^{\frac{1}{4}}}$

7. $\frac{y^{\frac{1}{2}}}{y^{\frac{1}{4}}}$

8. $\frac{n^{\frac{1}{3}}}{n^{\frac{1}{6}} \cdot n^{\frac{1}{2}}}$

9. $g^{\frac{4}{7}} \cdot g^{\frac{3}{7}}$

10. $s^{\frac{3}{4}} \cdot s^{\frac{13}{4}}$

11. $(u^{-\frac{1}{3}})^{-\frac{4}{5}}$

12. $y^{-\frac{1}{2}}$

13. $b^{-\frac{3}{5}}$

14. $\frac{q^{\frac{5}{2}}}{q^{\frac{3}{5}}}$

15. $\frac{t^{\frac{2}{3}}}{5t^{\frac{1}{2}} \cdot t^{-\frac{3}{4}}}$

16. $\frac{x^{-\frac{1}{2}}}{x^{-\frac{1}{3}}}$

17. $(a^{\frac{2}{3}})^{\frac{6}{5}} \cdot (a^{\frac{2}{5}})^3$

1. $c^{\frac{12}{5}} \cdot c^{\frac{3}{5}} = c^{\frac{12}{5} + \frac{3}{5}} = c^{\frac{15}{5}} = \boxed{c^3}$

2. $m^{\frac{2}{9}} \cdot m^{\frac{16}{9}} = m^{\frac{2}{9} + \frac{16}{9}} = m^{\frac{18}{9}} = \boxed{m^2}$

3. $(q^{\frac{1}{2}})^{\frac{3}{2}} = q^{\frac{1 \cdot 3}{2 \cdot 2}} = \boxed{q^{\frac{3}{4}}}$

4. $p^{-\frac{1}{5}} = \frac{1}{p^{\frac{1}{5}}} \cdot \frac{p^{\frac{4}{5}}}{p^{\frac{4}{5}}} = \frac{p^{\frac{4}{5}}}{p^{\frac{1}{5} + \frac{4}{5}}} = \frac{p^{\frac{4}{5}}}{p^{\frac{5}{5}}} = \boxed{\frac{p^{\frac{4}{5}}}{p}}$

5. $x^{-\frac{6}{11}} = \frac{1}{x^{\frac{6}{11}}} \cdot \frac{x^{\frac{5}{11}}}{x^{\frac{5}{11}}} = \frac{x^{\frac{5}{11}}}{x^{\frac{6}{11} + \frac{5}{11}}} = \frac{x^{\frac{5}{11}}}{x^{\frac{11}{11}}} = \boxed{\frac{x^{\frac{5}{11}}}{x}}$

6. $\frac{x^{\frac{2}{3}}}{x^{\frac{1}{4}}} = x^{\frac{2}{3} - \frac{1}{4}} = x^{\frac{2 \cdot 4}{3 \cdot 4} - \frac{1 \cdot 3}{4 \cdot 3}} = x^{\frac{8}{12} - \frac{3}{12}} = \boxed{x^{\frac{5}{12}}}$

7. $\frac{y^{-\frac{1}{2}}}{y^{\frac{1}{4}}} = y^{-\frac{1}{2} - \frac{1}{4}} = y^{-\frac{1 \cdot 2}{2 \cdot 2} - \frac{1}{4}} = y^{-\frac{2}{4} - \frac{1}{4}} = y^{-\frac{3}{4}} = \frac{1}{y^{\frac{3}{4}}} \cdot \frac{y^{\frac{1}{4}}}{y^{\frac{1}{4}}} = \frac{y^{\frac{1}{4}}}{y^{\frac{3}{4} + \frac{1}{4}}} = \boxed{\frac{y^{\frac{1}{4}}}{y}}$

8. $\frac{n^{\frac{1}{3}}}{n^{\frac{1}{6}} \cdot n^{\frac{1}{2}}} = \frac{n^{\frac{1}{3}}}{n^{\frac{1}{6} + \frac{1}{2}}} = \frac{n^{\frac{1}{3}}}{n^{\frac{1}{6} + \frac{3}{6}}} = \frac{n^{\frac{1}{3}}}{n^{\frac{4}{6}}} = \frac{n^{\frac{1}{3}}}{n^{\frac{2}{3}}} = n^{\frac{1}{3} - \frac{2}{3}} = n^{-\frac{1}{3}} = \frac{1}{n^{\frac{1}{3}}} \cdot \frac{n^{\frac{2}{3}}}{n^{\frac{2}{3}}} = \boxed{\frac{n^{\frac{2}{3}}}{n}}$

9. $g^{\frac{4}{7}} \cdot g^{\frac{3}{7}} = g^{\frac{4}{7} + \frac{3}{7}} = g^{\frac{7}{7}} = \boxed{g}$

10. $s^{\frac{3}{4}} \cdot s^{\frac{13}{4}} = s^{\frac{3}{4} + \frac{13}{4}} = s^{\frac{16}{4}} = \boxed{s^4}$

11. $(u^{-\frac{1}{3}})^{-\frac{4}{5}} = u^{-\frac{1}{3} \cdot -\frac{4}{5}} = \boxed{u^{\frac{4}{15}}}$

12. $y^{-\frac{1}{2}} = \frac{1}{y^{\frac{1}{2}}} \cdot \frac{y^{\frac{1}{2}}}{y^{\frac{1}{2}}} = \frac{y^{\frac{1}{2}}}{y^{\frac{1}{2} + \frac{1}{2}}} = \boxed{\frac{y^{\frac{1}{2}}}{y}}$

13. $b^{-\frac{3}{5}} = \frac{1}{b^{\frac{3}{5}}} \cdot \frac{b^{\frac{2}{5}}}{b^{\frac{2}{5}}} = \frac{b^{\frac{2}{5}}}{b^{\frac{3}{5} + \frac{2}{5}}} = \boxed{\frac{b^{\frac{2}{5}}}{b}}$

14. $\frac{q^{\frac{3}{5}}}{q^{\frac{2}{5}}} = q^{\frac{3}{5} - \frac{2}{5}} = \boxed{q^{\frac{1}{5}}}$

15. $\frac{t^{\frac{2}{3}}}{5t^{\frac{1}{2}} \cdot t^{-\frac{3}{4}}} = \frac{t^{\frac{2}{3}}}{5t^{\frac{1}{2} - \frac{3}{4}}} = \frac{t^{\frac{2}{3}}}{5t^{\frac{2}{4} - \frac{3}{4}}} = \frac{t^{\frac{2}{3}}}{5t^{-\frac{1}{4}}} = \frac{1}{5} t^{\frac{2}{3} - (-\frac{1}{4})} = \frac{1}{5} t^{\frac{2 \cdot 4}{3 \cdot 4} + \frac{1 \cdot 3}{4 \cdot 3}} = \frac{1}{5} t^{\frac{8}{12} + \frac{3}{12}} = \frac{1}{5} t^{\frac{11}{12}} \text{ or } \boxed{\frac{t^{\frac{11}{12}}}{5}}$

16. $\frac{x^{-\frac{1}{2}}}{x^{-\frac{1}{3}}} = x^{-\frac{1}{2} - (-\frac{1}{3})} = x^{-\frac{1 \cdot 3}{2 \cdot 3} + \frac{1 \cdot 2}{3 \cdot 2}} = x^{-\frac{3}{6} + \frac{2}{6}} = x^{-\frac{1}{6}} = \frac{1}{x^{\frac{1}{6}}} \cdot \frac{x^{\frac{5}{6}}}{x^{\frac{5}{6}}} = \boxed{\frac{x^{\frac{5}{6}}}{x}}$

17. $(a^{\frac{2}{3}})^{\frac{6}{5}} \cdot (a^{\frac{2}{5}})^3 = a^{\frac{2 \cdot 6}{3 \cdot 5}} \cdot a^{\frac{2 \cdot 3}{5 \cdot 1}} = a^{\frac{12}{5}} \cdot a^{\frac{6}{5}} = a^{\frac{12}{5} + \frac{6}{5}} = a^{\frac{18}{5}} = \boxed{a^{\frac{18}{5}}}$