

7-6 Skills Practice

Rational Exponents

Write each expression in radical form.

1. $3^{\frac{1}{6}}$ $\sqrt[6]{3}$

2. $8^{\frac{1}{5}}$ $\sqrt[5]{8}$

3. $12^{\frac{2}{3}}$ $\sqrt[3]{12^2} \rightarrow \sqrt[3]{144}$

4. $(s^3)^{\frac{3}{5}}$ $\sqrt[5]{(s^3)^3} = \sqrt[5]{s^9}$

Write each radical using rational exponents.

5. $\sqrt{51}$ $51^{\frac{1}{2}}$

6. $\sqrt[3]{37}$ $37^{\frac{1}{3}}$

7. $\sqrt[4]{15^3}$ $15^{\frac{3}{4}}$

8. $\sqrt[3]{6xy^2}$ $6^{\frac{1}{3}} x^{\frac{1}{3}} y^{\frac{2}{3}}$

Evaluate each expression.

9. $32^{\frac{1}{5}}$ $\sqrt[5]{32}$ or $(2^5)^{\frac{1}{5}} = 2$

10. $81^{\frac{1}{4}}$ $\rightarrow \sqrt[4]{81} = 3$

11. $27^{-\frac{1}{3}}$ $\frac{1}{27^{\frac{1}{3}}}$ or $\frac{1}{\sqrt[3]{27}} = \frac{1}{3}$

12. $4^{-\frac{1}{2}}$ $\frac{1}{4^{\frac{1}{2}}} \rightarrow \frac{1}{\sqrt{4}} = \frac{1}{2}$

13. $16^{\frac{3}{2}}$ $\sqrt{16^3} \rightarrow (\sqrt{16})^3 \rightarrow 4^3 = 64$

14. $(-243)^{\frac{4}{5}}$ $\sqrt[5]{(-243)^4} \rightarrow (\sqrt[5]{-243})^4 = (-3)^4 = 81$

15. $27^{\frac{1}{3}} \cdot 27^{\frac{5}{3}}$ $27^{\frac{6}{3}} \rightarrow 27^2 = 729$

16. $(\frac{4}{9})^{\frac{3}{2}}$ $(\sqrt{\frac{4}{9}})^3 = (\frac{2}{3})^3 = \frac{8}{27}$

Simplify each expression.

17. $c^{\frac{12}{5}} \cdot c^{\frac{3}{5}}$ $c^{\frac{15}{5}} = c^3$

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

19. $(q^{\frac{1}{2}})^3$ $q^{\frac{3}{2}}$ or $\sqrt{q^3} = q\sqrt{q}$

20. $p^{-\frac{1}{5}}$ $\frac{1}{p^{\frac{1}{5}}}$ or $\frac{p^{\frac{4}{5}}}{p^{\frac{4}{5}}} = \frac{p^{\frac{4}{5}}}{p}$ or $\frac{\sqrt[5]{p^4}}{p}$

21. $x^{-\frac{6}{11}}$ $\frac{1}{\sqrt[11]{x^6}}$ or $\frac{\sqrt[11]{x^5}}{\sqrt[11]{x^5}} = \frac{\sqrt[11]{x^5}}{x}$

22. $\frac{x^{\frac{2}{3}}}{x^4}$ $x^{\frac{2}{3} - \frac{3}{1}} = x^{-\frac{7}{3}}$

23. $\frac{y^{-\frac{1}{2}}}{y^{\frac{1}{4}}}$ $y^{-\frac{2}{4} - \frac{1}{4}} = y^{-\frac{3}{4}} = \frac{1}{\sqrt[4]{y^3}}$

24. $\frac{n^{\frac{1}{3}}}{n^{\frac{1}{6}} \cdot n^{\frac{1}{2}}}$ $\rightarrow \frac{n^{\frac{1}{3}}}{n^{\frac{2}{3}}} \rightarrow n^{\frac{1}{3} - \frac{2}{3}} = n^{-\frac{1}{3}} = \frac{1}{n^{\frac{1}{3}}}$

25. $\sqrt[12]{64}$ $\sqrt[12]{2^6} \rightarrow 2^{\frac{6}{12}} \rightarrow 2^{\frac{1}{2}} = \sqrt{2}$

26. $\sqrt[8]{49a^8b^2}$ $49^{\frac{1}{8}} \cdot a^{\frac{8}{8}} \cdot b^{\frac{2}{8}}$
 $7^{\frac{2}{4}} \cdot a \cdot b^{\frac{1}{4}} \rightarrow 7^{\frac{1}{4}} a b^{\frac{1}{4}} = a^4 \sqrt[4]{7b}$