Name Answer Key

PreCalculus; Sec 2.5.2 – Exponent Properties: Rationals

Simplify each expression. Answers should be left as fractions (when necessary) and have positive exponents.

1. $8^{2/3}$

$\sqrt[3]{8^2}$

4

2. $32^{2/5}$

$\sqrt[5]{32^2}$

4

3. $27^{-1/3}$

$\frac{1}{\sqrt[3]{27}} = \boxed{\frac{1}{3}}$

4. $(-32)^{-3/5}$

$\frac{1}{\sqrt[5]{(-32)^3}} = \boxed{\frac{1}{-8}}$

5. $16^{1/2}$

4

6. $\left(\frac{4}{81}\right)^{3/2}$

$\sqrt{\left(\frac{4}{81}\right)^3}$

$\boxed{\frac{8}{729}}$

7. $(-8)^{2/3}$

$\sqrt[3]{(-8)^2}$

$\boxed{4}$

8. $\left(\frac{1}{64}\right)^{-2/3}$

$\sqrt[3]{(64)^2}$

$\boxed{16}$

9. $16^{-3/4}$

$\frac{1}{\sqrt[4]{16^3}} = \boxed{\frac{1}{8}}$

10. $\left(\frac{9}{16}\right)^{1/2}$

$\frac{3}{4}$

11. $\left(\frac{8}{27}\right)^{-2/3}$

$\frac{9}{4}$

12. $4^{5/2}$

32

13. $27^{1/3}$

3

14. $4^{-3/2}$

$\frac{1}{8}$

15. $25^{3/2}$

125

16. $64^{1/6}$

2

17. $100^{-1/2}$

$\frac{1}{10}$

18. $\left(\frac{1}{9}\right)^{-3/2}$

27

19. $(a^{15})^{1/5}$

a^3

20. $(x^{10})^{1/5}$

x^2

21. $(16x^4y^8)^{1/4}$

$2xy^2$

22. $(x^3y^6)^{1/3}$

xy^2

23. $y^{2/3} \cdot y^{7/3}$

y^3

24. $a^{3/5} \cdot a^{7/5}$

a^2

25. $(x^4y)^{1/2}$

$x^2y^{1/2}$

26. $(a^{1/2}b^{1/3})^2$

$ab^{2/3}$

27. $(2a^{1/2})(3a)$

$6a^{3/2}$

28. $(-3y^{1/3})(-2y^{1/2})$

$6y^{5/6}$

29. $\frac{6a^{1/2}}{2a^{1/3}}$

$3a^{1/6}$

30. $\frac{-4y}{2y^{2/3}}$

$-2y^{1/3}$

31. $(a^2b^{1/2})(a^{1/3}b^{-1/2})$

$a^{7/3}b^{0}$

$\boxed{a^{7/3}}$

32. $(4^{3/4}a^2b^3)(4^{3/4}a^{-2}b^{-5})$

$4^{6/4}a^{0}b^{-2}$

$\boxed{\frac{8}{b^2}}$

33. $\left(\frac{x^6y^3}{z^9}\right)^{1/3}$

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

34. $\left(\frac{x^{1/2}y}{y^{1/2}}\right)^3$

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

$\boxed{x^{3/2}y^{3/2}}$

35. $\left(\frac{a^{-1/2}}{b^{-1/4}}\right)^{-4}$

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

36. $\frac{64^{5/9}\cdot 64^{2/9}}{4^{3/4}}$

$\frac{2^{30/9}\cdot 2^{12/9}}{2^{6/4}} = \frac{2^{14/3}}{2^{3/2}}$

$\boxed{= 2^{19/6} \\ = 4^{19/12} \\ = 64^{19/36}}$

37. $(16^{5/9}\cdot 5^{7/9})^{-3}$

$16^{-15/9}\cdot 5^{-21/9}$

$\boxed{\frac{1}{16^{5/3}\cdot 5^{7/3}}}$

38. $\frac{-3}{\sqrt[5]{x^6}}$

$\frac{-3}{x^{6/5}}$

39. $\frac{\sqrt[4]{x^6}}{\sqrt[7]{x^5}}$

$\frac{x^{6/4}}{x^{5/7}}$

$\boxed{x^{11/14}}$