REVIEW OF EXPONENTS AND ROOTS
More Practice Exercises

Simplify each expression. Assume that all variables used as exponents represent integers and that all other variables represent nonzero real numbers. Write all answers with only positive exponents. Evaluate whenever possible.

1. $\left(\beta^3\alpha^2\right)^4\left(\beta^6\alpha^{-3}\right)^{-2}$

2. $\left(v^{-6}q^2\right)^4\left(v^6q^{-3}\right)^{-4}$

3. $(2^{-3})(3^{-2})$

4. $(-3c^2b^4)^3$

5. $\dfrac{12^7}{12^5}$

6. $\dfrac{m^3n^5}{m^8n^2}$

7. $\left(-2k^{-2}p^2\right)^{-2}\left(-3k^2p^{-3}\right)^{-1}$

8. $\dfrac{(-f^2)^3(2f^3)^{-2}\left(-3f^2\right)^{-1}}{(6f^2)^{-3}}$

9. $\dfrac{(-3ab^2)^3(2a^2b^{-3})^4}{(a^5b)^{-6}}$

10. $\dfrac{w^7+w^5-w^{-4}}{w^{-5}}$

11. $\dfrac{(\sigma+\delta)^5(\sigma+\delta)^{-7}}{(\sigma+\delta)^8(\sigma+\delta)^{-12}}$

12. $\dfrac{-5d^4(-2d^6g^{-2})^4}{(4d^3)^3 10g^{-10}}$

13. $16^{1/4}\left(8^{1/3}\right)$

14. $64^{1/2}\left(27^{1/3}\right)$

15. $\left(a^{16}b^3\right)^{1/4}\left(ab^{1/8}\right)^{3/2}$

16. $\dfrac{\sqrt[5]{x^9y^4}\sqrt[5]{x^6y}}{x^2}$

17. $\dfrac{\left(\sqrt[3]{r^7}\right)\left(\sqrt[3]{r^{20}}\right)}{r^3}$

18. $\dfrac{\sqrt[4]{x^6y^{12}}\sqrt{xy^3}}{xy^2}$

19. $\dfrac{k^{1/3}k^{1/4}}{k^{1/6}}$

20. $\dfrac{\left(\sqrt[4]{s^6r^7}\sqrt{rt^6}\right)^3}{\sqrt{s^3t^2}}$