

B. Simplify each of the following.

1. $\frac{8^5 \times 8^6}{8^3 \times 8^4} = \frac{8^{11}}{8^7} = 8^4$

2. $\frac{7^{10} \times 7^5}{7^{-3}} = \frac{7^{15}}{7^{-3}} = 7^{18}$

3. $\frac{5^{-3} \times 6^{-3} \times 9^{-4}}{5^{-6} \times 6^{-5} \times 9^{-3}} = \frac{5^3 6^2}{9}$

4. $\frac{12^1 \times 12^2 \times 12^{-3}}{12^{-5}} = \frac{12^0}{12^{-5}} = 12^5$

5. $\frac{8^{-3} \times 7^6}{8^{-3} \times 7^6} = 1$

6. $\frac{7^{-12} \times 7^6 \times 7^9}{7^6 \times 7^8} = \frac{7^3}{7^{14}} = 7^{-11} = \frac{1}{7^{11}}$

7. $\frac{5^{-3} \times 8^6 \times 5^{-4} \times 8^7}{5^{-8} \times 8^5 \times 5^{-3}} = \frac{5^{-7} 8^{13}}{5^{-11} 8^5} = 5^4 8^8$

8. $\frac{7^8 \times 8^5 \times 9^3 \times 8^5}{7^5 \times 9^4 \times 8^3} = \frac{7^3 8^7}{9}$

9. $\frac{6^3 \times 6^5 + 6^8}{6^7 \times 6^3 \times 6^2} = \frac{1}{6^{12}}$

10. $\frac{\cancel{x} y^8 z^0}{\cancel{x} y^{-8} z^0} = y^{16}$

11. $\frac{\cancel{15}^{-10} \times 5^{-4}}{5^{-8} \times \cancel{15}^{-10}} = 5^4$

12. $\frac{x^3 y^3 z^5}{x^{-2} y^5 z^{-8}} = \frac{x z^{13}}{y^2}$

13. $\frac{x^{15} \cdot y^{-20} \cdot z^{-20}}{x^6 \cdot y^{-30} \cdot z^{-8}} = \frac{x^9 y^{10}}{z^{12}}$

14. $\frac{4^{-3} \cdot x^{-5} \cdot y^{-6}}{4^8 \cdot x^{-6} \cdot y^7} = \frac{x}{4^{11} y^{13}}$

15. $\frac{5^{10} \cdot x^7 \cdot y^8}{5^2 \cdot x^6 y^2} = 5^8 x y^6$

16. $\frac{12^{16} 15^{-21} 17^{-4} 12^5 15^3 17^5}{12^{-4} 15^{-3} 17^4 15^6} = \frac{12^{25} 15^{-18} 17^1}{15^3 17^4}$

17. $\frac{12^2 \cdot 13^{-5} \cdot 12^{-3} \cdot 13^{-7} \cdot 12^3}{12^5 \cdot 13^3 \cdot 13^6 \cdot 12^5} = 1$

18. $\frac{y^8 x^1 (x^{24} + x^{14}) x^1 y^9}{(y^7 + y^5) x^1 x^{16}} = \frac{y^{15} 15^{21} 17^3}{x^5}$

19. $\frac{x^{16} + x^{12}}{x^{14} + x^9} = \frac{x^4}{x^5} = \frac{1}{x^1}$

20. $\frac{5^2 \cdot 6^5 \cdot 5^{-4} \cdot 6^3}{5^3 \cdot 6^4 \cdot 5^8 \cdot 6^{-7}} = \frac{5^{-2}}{5^3 6^{-11}} = \frac{6^{11}}{5^5}$