

Simplify each of the following. Assume that all variables represent positive numbers. Present your answer without negative exponents.

1. 3^{-2}

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

3. m^{-4}

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

5. $a^8 \cdot a^{-1}$

6. $p^3(p^{-7})p^8$

7. $\frac{x^{-4}}{x^{-9}}$

8. $\frac{50a^{12}}{10a^{-3}}$

9. $\frac{t^{-3}}{t^4}$

10. x^0

11. $-x^0$

12. $(-x)^0$

13. $(b^{-5})(b^2)(b^{-1})$

14. $\frac{1}{(b^{-5})(b^2)(b^{-1})}$

15. $\frac{m^{-2}}{m^{-5}}$

16. $\frac{x^3y^{-5}}{z^{-4}}$

17. $\frac{18q^3}{6q^{-3}}$

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

19. $2y^{-3}$

20. $(2y)^{-3}$

21. $\left(-\frac{3}{5}\right)^{-2}$

22. $\frac{a^3b^{-5}}{a^{-2}b^3}$

23. $(3m^3)^{-2}$

24. $(-2ab^{-3})^{-3}$

25. $\frac{(k^3)^{-3}}{(k^{-5})^2}$

26. $\left(\frac{2a^{-3}b^5}{-3a^3b^{-2}}\right)^{-2}(a^3b^{-5})^{-3}$

27. $(-2a^{-3})(-2a^{-2}b)^{-4}$

28. $\frac{(-3p^3q^5)^2}{(2q^0p^3)^{-1}}$

29. $\left(\frac{2a^{-2}b^3}{-2^2(a^{-1}b)^{-3}}\right)^{-2}$

30. $\left(-\frac{x^3y^0x^{-5}}{y^{-3}}\right)^{-2}$

31. $\left(-\frac{x^3y^7x^{-5}}{y^{-3}}\right)^0$

32. $\frac{x^{-1}+y^{-1}}{x^{-2}-y^{-2}}$

33. $\frac{(-2a^{-2})^{-2}b^3a^0(-aba^{-2}b^{-2})^{-3}}{2a^2(-2a^{-2}b)^{-2}ab^0}$

34. $\left(\frac{-a^2(b^{-1}a)^{-5}}{b^7(-ab^2)^{-3}}\right)^{-2}$

35. $\frac{(x^{-2})^{-2}y^3x^0(-2yx^0y^{-2}x^{-2})^0}{yx^5(y^{-2}x)^{-3}(2x^{-1}yx^3)^{-1}}$

Answers

1. $\frac{1}{9}$

9. $\frac{1}{t^7}$

17. $3q^6$

23. $\frac{1}{9m^6}$

30. $\frac{x^4}{y^6}$

2. 8

10. 1

18. $\frac{27}{8}$

24. $-\frac{b^9}{8a^3}$

31. 1

3. $\frac{1}{m^4}$

11. -1

19. $\frac{2}{y^3}$

25. k

32. $\frac{xy}{y-x}$

4. x^5

12. 1

26. $\frac{9}{4}a^3b$

33. $-\frac{b^8}{2}$

5. a^7

13. $\frac{1}{b^4}$

20. $\frac{1}{8y^3}$

27. $-\frac{a^5}{8b^4}$

6. p^4

14. b^4

21. $\frac{25}{9}$

28. $18p^9q^{10}$

34. $\frac{1}{b^8}$

7. x^5

15. m^3

22. $\frac{a^5}{b^8}$

29. $\frac{4a^{10}}{b^{12}}$

35. $\frac{2x^4}{y^3}$

16. $\frac{x^3z^4}{y^5}$

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