

Simplify the following, positive exponents only in the answer.

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|---|---|---|---|---------------------------------------|
| 1. $4^2 \cdot 4^5$ | 2. $2^{-4} \cdot 2^{-5} \cdot 2^5$ | 3. $3^{-5} \cdot 3^{-1}$ | 4. $2^{-14} \div 2^{-8}$ | 5. $5^{-3} \div 5$ |
| 6. $m^5 \div m^9$ | 7. $x^4 \div x^{-5}$ | 8. $y^{-2} \div y^{-3}$ | 9. $(g^2)^4$ | 10. $(m^3)^2$ |
| 11. $(2x^2)^3$ | 12. $(6a^2)^4$ | 13. $(7^{-2})^2$ | 14. $(2^4)^{-2}$ | 15. $(3^{-3})^{-2}$ |
| 16. $(y^4)^{-4}$ | 17. $(b^{-4})^2$ | 18. $(z^{-2})^{-6}$ | 19. $\frac{x^4 \cdot x^2 \cdot x^5}{x^3 \cdot x^9}$ | |
| 20. $\frac{m^2 \cdot m^5 \cdot m}{m^4 \cdot m^3}$ | 21. $\frac{a^{-5} \cdot b^2 \cdot c^3}{a^{-6} \cdot b^3 \cdot c}$ | 22. $\frac{a^{-3} \cdot b^{-4} \cdot c^6}{a^2 \cdot b^3 \cdot c^8}$ | 23. $\frac{18m^4n^3q^5}{36m^7n^4q^5}$ | |
| 24. $\frac{27a^5b^3c^4}{9a^8b^4c^3}$ | 25. $\frac{m^{-2}n^6p^3}{m^4n^{-5}p^{-2}}$ | 26. $(-x^4y^5z)^3$ | 27. $(-3m^4n^5q^2)^3$ | |
| 28. $(-2x^4y^3z^5)^6$ | 29. $(3a^2)(2a^4)$ | 30. $(q^5)^3(2q^2)$ | 31. $(4n^3)(n^5)$ | |
| 32. $(5z^2)(5z^5)^2$ | 33. $(5a^4)(6a^2)(3a^3)$ | 34. $(m^4)^2(-2m^5)(m^2)^{-4}$ | 35. $\frac{24m^5n^7}{12m^5n^7}$ | |
| 36. $\frac{(4m^2n^4)(6m^4n^3)}{(8mn^3)(m^3n^2)}$ | 37. $\frac{(9x^5y^5)(4x^6y)}{(6x^7y^3)(3x^4y^3)}$ | 38. $\frac{(32a^2x^8)(-5a^4x^3)}{(5ax)(-2a^2x^2)(-4a^3x)}$ | | |
| 39. $(-4)^{-3}$ | 40. -3^{-4} | 41. -4^0 | 42. $\left(\frac{1}{4}\right)^{-1}$ | 43. $\left(\frac{-1}{2}\right)^3$ |
| 44. $\left(\frac{-1}{8}\right)^{-2}$ | 45. $\frac{1}{10^{-3}}$ | 46. $3^{-2} + 2^{-1}$ | 47. $\frac{2^{-1} + 3^{-1}}{3^{-2}}$ | 48. $(6^0 \cdot 3^{-1}) \cdot 4^{-2}$ |

Answers:

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| 1. 16384 | 2. $\frac{1}{16}$ | 3. $\frac{1}{729}$ | 4. $\frac{1}{64}$ | 5. $\frac{1}{625}$ | 6. $\frac{1}{m^4}$ |
| 7. x^9 | 8. y | 9. g^8 | 10. m^6 | 11. $8x^6$ | 12. $1296a^8$ |
| 13. $\frac{1}{2401}$ | 14. $\frac{1}{256}$ | 15. 729 | 16. $\frac{1}{y^{16}}$ | 17. $\frac{1}{b^8}$ | 18. z^{12} |
| 19. $\frac{1}{x}$ | 20. m | 21. $\frac{ac^2}{b}$ | 22. $\frac{1}{a^5b^7c^2}$ | 23. $\frac{1}{2m^3n}$ | 24. $\frac{3c}{a^3b}$ |
| 25. $\frac{n^{11}p^5}{m^6}$ | 26. $-x^{12}y^{15}z^3$ | 27. $-27m^{12}n^{15}q^6$ | 28. $64x^{24}y^{18}z^{30}$ | 29. $6a^6$ | 30. $2q^{17}$ |
| 31. $4n^8$ | 32. $125z^{12}$ | 33. $90a^9$ | 34. $-2m^5$ | 35. 2 | 36. $3m^2n^2$ |
| 37. 2 | 38. $-4x^7$ | 39. $-\frac{1}{64}$ | 40. $-\frac{1}{81}$ | 41. -1 | 42. 4 |
| 43. $-\frac{1}{8}$ | 44. 64 | 45. 1000 | 46. $\frac{11}{18}$ | 47. $\frac{15}{2}$ | 48. $\frac{1}{48}$ |