

Practice 8-6

Example Exercises

Example 1

Simplify each expression.

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|------------------------------|--------------------------------------|------------------------------|------------------------------|
| 1. $a^2 \cdot a^3$ | 2. $b^4 \cdot b^6$ | 3. $x^5 \cdot x$ | 4. $5^2 \cdot 5^4$ |
| 5. $m^3 \cdot n^4 \cdot m^5$ | 6. $x^2 \cdot y^3 \cdot y^2 \cdot x$ | 7. $p^3 \cdot q^5 \cdot p^7$ | 8. $s^4 \cdot t^5 \cdot t^3$ |
| 9. $(3m^3)(2m^5)$ | 10. $(-5m^2)(-2m^4)$ | 11. $4^3 \cdot 4^4$ | 12. $(6p^5)(8p^4)$ |
| 13. $(2x^2y)(3xy^4)$ | 14. $(-2a^2b^3)(3a^4)$ | 15. $(5x^2y^3)(-2x^4y^5)$ | 16. $(3m^2n^5)(-8mn^2)$ |

Example 2

Simplify. Give the answer in scientific notation.

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|---------------------------------------|---|---|
| 17. $(2 \times 10^3)(4 \times 10^5)$ | 18. $(3.5 \times 10^5)(2 \times 10^9)$ | 19. $(8 \times 10^{11})(2.5 \times 10^3)$ |
| 20. $3(4 \times 10^5)(5 \times 10^3)$ | 21. $200(5 \times 10^3)(1 \times 10^7)$ | 22. $(9 \times 10^8)(0.2 \times 10^4)$ |
23. The speed of light is approximately 1.86×10^5 mi/s. If it takes light from the sun 5.1×10^2 s to reach the earth, how far away is the sun?
24. One liter equals 1×10^6 mm³. There are 5×10^6 red blood cells in 1 mm³ of human blood. How many red blood cells are there in 1 L of human blood?
25. Suppose you are an astronaut on a mission to Mars. Your spacecraft is traveling at a speed of 2.5×10^4 mi/h. It takes you 5.5×10^3 h to reach Mars. How many miles do you travel?

Example 3

Simplify each expression. Use only positive exponents.

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|-------------------------------------|----------------------------------|----------------------------------|-------------------------------------|
| 26. $m^8 \cdot m^{-5}$ | 27. $r^3 \cdot r^{-2}$ | 28. $a^{-5} \cdot a^3$ | 29. $x^{-4} \cdot x^{-7} \cdot x^5$ |
| 30. $n^{-3} \cdot n^{-4}$ | 31. $(2a^{-3})(5a^4)$ | 32. $(-3p^{-5})(2p^8)$ | 33. $s^3 \cdot s^{-5} \cdot s^7$ |
| 34. $\frac{1}{b^{-8} \cdot b^{-1}}$ | 35. $\frac{1}{x^3 \cdot x^{-7}}$ | 36. $\frac{1}{y^{-5} \cdot y^8}$ | 37. $\frac{1}{m \cdot m^{-3}}$ |

Simplify. Give the answer in scientific notation.

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|---|--|---|
| 38. $(2 \times 10^{-4})(5 \times 10^2)$ | 39. $(3 \times 10^{-2})(4 \times 10^{-3})$ | 40. $(8 \times 10^5)(7 \times 10^{-2})$ |
| 41. $(6 \times 10^8)(7 \times 10^{-12})$ | 42. $(7.5 \times 10^{-1})(2 \times 10^3)$ | 43. $(2 \times 10^{13})(3.6 \times 10^{-9})$ |
| 44. $(4 \times 10^6)(2.5 \times 10^{-3})$ | 45. $(4.6 \times 10^{-3})(3 \times 10^{-1})$ | 46. $(3.4 \times 10^{-11})(4 \times 10^{-8})$ |