

5-2 EXERCISES

A

Simplify.

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|------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|
| 1. $(2^5)^2$ | 2. $(3^4)^3$ | 3. $(5^2)^3$ | 4. $(6^8)^9$ |
| 5. $(y^5)^9$ | 6. $(x^3)^5$ | 7. $(m^8)^4$ | 8. $(n^5)^{12}$ |
| 9. $(a^6)^5$ | 10. $(y^7)^7$ | 11. $(p^{10})^{10}$ | 12. $(w^{12})^7$ |
| 13. $(3y)^4$ | 14. $(2t)^5$ | 15. $(7y)^3$ | 16. $(8x)^4$ |
| 17. $(5m)^2$ | 18. $(4y)^5$ | 19. $(7x)^4$ | 20. $(12a)^3$ |
| 21. $(2m^2)^2$ | 22. $(4n^3)^2$ | 23. $(5y^4)^3$ | 24. $(3x^5)^4$ |
| 25. $(-6t^2)^3$ | 26. $(-10b^6)^2$ | 27. $(8k^4)^3$ | 28. $(7x^5)^3$ |
| 29. $(2x^8y^3)^2$ | 30. $(3mn^4)^3$ | 31. $(-2x^2y^4)^3$ | 32. $(-3m^4n^2)^2$ |
| 33. $(4x^2y^3z)^4$ | 34. $(2m^5n^4p^3)^3$ | 35. $\left(\frac{3}{a^2}\right)^3$ | 36. $\left(\frac{7}{x^7}\right)^2$ |
| 37. $\left(\frac{x^2}{4}\right)^4$ | 38. $\left(\frac{y^5}{3}\right)^2$ | 39. $\left(\frac{m^4}{n^2}\right)^3$ | 40. $\left(\frac{a^8}{b^4}\right)^3$ |

B

Simplify.

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| 41. $\left(\frac{3 \cdot 2^2}{5}\right)^3$ | 42. $\left(\frac{5 \cdot 2^4}{3}\right)^2$ | 43. $\left(\frac{xy^2}{z}\right)^3$ |
| 44. $\left(\frac{ab^4}{c}\right)^3$ | 45. $\left(\frac{-2x^2y^6}{5}\right)^2$ | 46. $\left(\frac{3x^3y^3}{2}\right)^4$ |
| 47. $\left(\frac{-4m^2n^5}{3}\right)^3$ | 48. $\left(\frac{-5p^4q^3}{2}\right)^3$ | 49. $[(-x^5)]^6$ |
| 50. $[(-y)^{18}]^2$ | 51. $\left(\frac{-x}{3y}\right)^3$ | 52. $\left(\frac{2c}{-y}\right)^4$ |
| 53. $\left(\frac{x^2y}{z}\right)^3$ | 54. $\left(\frac{m}{n^4p}\right)^3$ | 55. $\left(\frac{-3a^2b^4}{4c^3}\right)^2$ |
| 56. $\left(\frac{2m^5n^5}{p^6}\right)^3$ | 57. $(2n)^4\left(\frac{3}{2}n\right)^3$ | 58. $(4x^3)^2 + (2x^2)^3$ |
| 59. $(7a)(4a) - (3a)^2$ | 60. $(-2y^2)^3 + 4y(2y^5)$ | 61. $(-3z^4)^2 - (z^2)^4$ |
| 62. $(6cd^2)^2 + 3cd(cd^3)$ | 63. $3z^3(2z^4) - (-5z^3)^2$ | |
| 64. $b^2(a^3b)^2 + a^2(a^2b^2)^2$ | 65. $(3c^4)^2(2c)$ | |
| 66. $(-2x^2y^3)^4(xy)^3$ | 67. $(-3a^2b^4)^3(4a^3b)^2$ | |

68. **Critical Thinking** Does $(a^m)^n = (a^n)^m$ for all rational numbers a and all natural numbers m and n ? Explain.