5-1 EXERCISES

A

Simplify. Express using exponents.

1. $2^4 \cdot 2^3$ 2^7
2. $3^5 \cdot 3^2$ 3^7
3. $8^5 \cdot 8^9$ 8^{14}
4. $n^3 \cdot n^{20}$ n^{23}
5. $x^4 \cdot x^3$ x^7
6. $y^7 \cdot y^9$ y^{16}
7. $n^3 \cdot n$ n^4
8. $z^7 \cdot z^7$ z^{14}
9. $x^3 \cdot x^1$ x^4
10. $a^6 \cdot a^8$ a^{14}
11. $m^7 \cdot m^0$ m^7
12. $p \cdot p \cdot p$ p^3
13. $x^4 \cdot x^2 \cdot x$
14. $y^2 \cdot y^4 \cdot y^3$
15. $a^3 \cdot a^4 \cdot a \cdot a$
16. $b \cdot b^5 \cdot b^2 \cdot b^2$
17. $(a^3b^6)(a^5b)$
18. $(x^2y)(x^5y^2)$
19. $(p^2q^3r^2)(pqr^3)$
20. $(x^7y^4z^4)(x^2y^5z^8)$
21. $(5s^2t^3)(5s^2t)$
22. $(2xy^2)(2x^2y^2)$

23. $\frac{7^5}{7^2}$ 7^3
24. $\frac{4^7}{4^3}$ 4^4
25. $\frac{8^{12}}{8^6}$ 8^6
26. $\frac{9^{15}}{9^2}$ 9^{13}
27. $\frac{6^4}{6^4}$ 1
28. $\frac{2^7}{2^7}$ 1
29. $\frac{y^9}{y^5}$ y^4
30. $\frac{x^{12}}{x^{11}}$ x
31. $\frac{a^6}{a^4}$ a^2
32. $\frac{n^8}{n^4}$ n^4
33. $\frac{x^4}{x^2}$ x^2
34. $\frac{y^9}{y^6}$ y^3
35. $\frac{g^5}{g^5}$ 1
36. $\frac{h^4}{h}$ h^3
37. $\frac{m^8}{m^8}$ 1
38. $\frac{x^7}{x^5}$ x^2
39. $\frac{x^2y^5}{y^3}$ x^2y^2
40. $\frac{m^6n^4}{m^3}$ m^3n^4
41. $\frac{a^6b^9}{a^5b^5}$ ab^4
42. $\frac{p^5q^7}{pq^4}$ p^4q^3
43. $\frac{a^3b^4}{ab}$ a^2b^3
44. $\frac{x^8y}{x^7y}$ x
45. $\frac{4^3x^3}{4^2x}$ $4x^2$
46. $\frac{6^4a^5b}{6^2a^2b}$ 6^2a^3

Express using positive exponents.

47. 3^{-2} $\frac{1}{3^2}$
48. 6^{-3} $\frac{1}{6^3}$
49. 2^{-4} $\frac{1}{2^4}$
50. 4^{-1} $\frac{1}{4}$
51. a^{-3} $\frac{1}{a^3}$
52. m^{-1} $\frac{1}{m}$
53. x^{-4} $\frac{1}{x^4}$
54. n^{-6} $\frac{1}{n^6}$
55. $3a^{-1}$ $\frac{3}{a}$
56. $(3x)^{-1}$ $\frac{1}{3x}$
57. $(2y)^{-1}$ $\frac{1}{2y}$
58. $4x^{-3}$ $\frac{4}{x^3}$
59. $5c^{-4}$ $\frac{5}{c^4}$
60. $8m^{-1}$ $\frac{8}{m}$
61. $(3a)^{-1}$ $\frac{1}{3a}$
62. cd^{-2} $\frac{c}{d^2}$

Simplify. Express without using exponents.

63. 4^{-2} $\frac{1}{16}$
64. 8^{-1} $\frac{1}{8}$
65. 7^{-1} $\frac{1}{7}$
66. 5^{-3} $\frac{1}{125}$
67. 1^{-4} 1
68. 5^0 1
69. 2^{-4} $\frac{1}{16}$
70. 1^{-3} 1
71. n^0 1
72. 6^{-2} $\frac{1}{36}$
73. 10^0 1
74. x^0 1

B

Simplify.

75. $(-2)^4(-2)^2$
76. $(-5)^2(-5)$
77. $\frac{(-3)^6}{(-3)^4}$
78. $\frac{(-10)^7}{(-10)^6}$
79. $\frac{4^3}{4^5}$
80. $\frac{3^4}{3^6}$
81. $\frac{(-2)^2}{(-2)^5}$
82. $\frac{(-5)^3}{(-5)^4}$

Assignment Guide

Minimum: 1–74 m3, MR

Regular: 1–74 m4, 75–98 e/o, 99, MR

Advanced: 1–74 m4, 75–98 e/o, 99, 100–107 e/o, MR

ADDITIONAL ANSWERS

Exercises

13. x^7
14. y^9
15. a^9
16. b^{10}
17. a^8b^7
18. x^7y^3
19. $p^3q^4r^5$
20. $x^9y^9z^{12}$
21. $5^2s^4t^4$
22. $2^2x^3y^4$

75. 64
76. -125
77. 9
78. -10
79. $\frac{1}{16}$
80. $\frac{1}{9}$
81. $-\frac{1}{8}$
82. $-\frac{1}{5}$