Key

1.5 The Exponent Rules

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To multiply powers with the same base, add the exponents. $y^m \times y^n = y^{m+n}$

To divide powers with the same base, subtract the exponents. $y^m \div y^n = y^{m-n}$

To raise a power to a power, multiply the exponents. $(y^m)^n = y^{m \times n}$

Simplify.

1. $4^4 \times 4^2$ 46
2. $3^5 \times 3^3$ 38
3. $2^2 \times 2^3$ 25
4. $10^3 \times 10$ 10^4
5. $5^4 \times 5^3$ 5^7
6. 6×6^4 6^5
7. $x^2 \times x^5$ x^7
8. $y^3 \times y^3$ y^6
9. $z^3 \times z^2$ z^5

Find the missing exponent.

10. $3^2 \times 3^{\blacksquare} = 3^4$ 2
11. $5^{\blacksquare} \times 5^4 = 5^7$ 3
12. $8^3 \times 8^{\blacksquare} = 8^5$ 2
13. $7^{\blacksquare} \times 7^3 = 7^4$ 1
14. $y^5 \times y^{\blacksquare} = y^8$ 3
15. $b^{\blacksquare} \times b^5 = b^9$ 4
16. $x \times x^9 = x^{\blacksquare}$ 10
17. $s^6 \times s^{\blacksquare} = s^7$ 1

Simplify.

18. $5^4 \div 5^2$ 5^2
19. $4^6 \div 4^3$ 4^3
20. $3^3 \div 3^2$ 3
21. $9^5 \div 9^2$ 9^3
22. $7^4 \div 7^3$ 7
23. $2^6 \div 2^4$ 2^2
24. $x^7 \div x^5$ x^2
25. $y^8 \div y^6$ y^2
26. $a^5 \div a^4$ a

Find the missing exponent.

27. $2^5 \div 2^{\blacksquare} = 2^3$ 2
28. $3^4 \div 3^{\blacksquare} = 3^2$ 2
29. $4^{\blacksquare} \div 4^2 = 4^4$ 6
30. $5^{\blacksquare} \div 5^3 = 5$ 4
31. $n^4 \div n^{\blacksquare} = n^2$ 2
32. $c^{\blacksquare} \div c^4 = c^3$ 5
33. $y^{\blacksquare} \div y^2 = y^2$ 4
34. $z^9 \div z^{\blacksquare} = z$ 8

Simplify.

35. $(3^2)^3$ 3^6
36. $(2^4)^2$ 2^8
37. $(7^3)^4$ 7^{12}
38. $(6^2)^4$ 6^8
39. $(5^3)^2$ 5^6
40. $(4^5)^3$ 4^{15}
41. $(x^3)^3$ x^9
42. $(s^2)^2$ s^4
43. $(r^5)^2$ r^{10}

Find the missing exponent.

44. $(3^3)^{\blacksquare} = 3^9$ 3
45. $(2^5)^{\blacksquare} = 2^{10}$ 2
46. $(5^{\blacksquare})^2 = 5^8$ 4
47. $(4^{\blacksquare})^3 = 4^{12}$ 4
48. $(g^2)^{\blacksquare} = g^6$ 3
49. $(m^3)^{\blacksquare} = m^9$ 3
50. $(s^{\blacksquare})^5 = s^{20}$ 4
51. $(t^{\blacksquare})^2 = t^6$ 3

Find the value of each expression. Replace the blanks with the corresponding letter or symbol to decode the message.

52. $2^3 \times 2^2$	C	53. $2^9 \div 2^2$	R
54. $2^4 \div 2^3$	A	55. $(2^3)^2$	O
56. $2^{13} \div 2^3$	C	57. $(2^6)^2$	!
58. 2×2	L	59. $(2^4)^2$	R
60. $2^2 \times 2^2$	*	61. $2^2 \times 2$	L
62. $(2^3)^3$	E	63. $2^{12} \div 2$	T

A L L * C O r r e c t !

2^1 2^2 2^3 2^4 2^5 2^6 2^7 2^8 2^9 2^{10} 2^{11} 2^{12}