Name _____

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. $4^4 \times 4^2$ _____
2. $3^5 \times 3^3$ _____
3. $2^2 \times 2^3$ _____
4. $10^3 \times 10$ _____
5. $5^4 \times 5^3$ _____
6. 6×6^4 _____
7. $x^2 \times x^5$ _____
8. $y^3 \times y^3$ _____
9. $z^3 \times z^2$ _____

Find the missing exponent.

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

Simplify.

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

Find the missing exponent.

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

Simplify.

35. $(3^2)^3$ _____
36. $(2^4)^2$ _____
37. $(7^3)^4$ _____
38. $(6^2)^4$ _____
39. $(5^3)^2$ _____
40. $(4^5)^3$ _____
41. $(x^3)^3$ _____
42. $(s^2)^2$ _____
43. $(r^5)^2$ _____

Find the missing exponent.

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

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

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