



Number Correct: \_\_\_\_\_

**Applying Properties of Exponents to Generate Equivalent Expressions—Round 1**

**Directions:** Simplify each expression using the laws of exponents. Use the least number of bases possible and only positive exponents. When appropriate, express answers without parentheses or as equal to 1. All letters denote numbers.

1.	$4^5 \cdot 4^{-4} =$	
2.	$4^5 \cdot 4^{-3} =$	
3.	$4^5 \cdot 4^{-2} =$	
4.	$7^{-4} \cdot 7^{11} =$	
5.	$7^{-4} \cdot 7^{10} =$	
6.	$7^{-4} \cdot 7^9 =$	
7.	$9^{-4} \cdot 9^{-3} =$	
8.	$9^{-4} \cdot 9^{-2} =$	
9.	$9^{-4} \cdot 9^{-1} =$	
10.	$9^{-4} \cdot 9^0 =$	
11.	$5^0 \cdot 5^1 =$	
12.	$5^0 \cdot 5^2 =$	
13.	$5^0 \cdot 5^3 =$	
14.	$(12^3)^9 =$	
15.	$(12^3)^{10} =$	
16.	$(12^3)^{11} =$	
17.	$(7^{-3})^{-8} =$	
18.	$(7^{-3})^{-9} =$	
19.	$(7^{-3})^{-10} =$	
20.	$\left(\frac{1}{2}\right)^9 =$	
21.	$\left(\frac{1}{2}\right)^8 =$	
22.	$\left(\frac{1}{2}\right)^7 =$	

23.	$\left(\frac{1}{2}\right)^6 =$	
24.	$(3x)^5 =$	
25.	$(3x)^7 =$	
26.	$(3x)^9 =$	
27.	$(8^{-2})^3 =$	
28.	$(8^{-3})^3 =$	
29.	$(8^{-4})^3 =$	
30.	$(22^0)^{50} =$	
31.	$(22^0)^{55} =$	
32.	$(22^0)^{60} =$	
33.	$\left(\frac{1}{11}\right)^{-5} =$	
34.	$\left(\frac{1}{11}\right)^{-6} =$	
35.	$\left(\frac{1}{11}\right)^{-7} =$	
36.	$\frac{56^{-23}}{56^{-34}} =$	
37.	$\frac{87^{-12}}{87^{-34}} =$	
38.	$\frac{23^{-15}}{23^{-17}} =$	
39.	$(-2)^{-12} \cdot (-2)^1 =$	
40.	$\frac{2y}{y^3} =$	
41.	$\frac{5xy^7}{15x^7y} =$	
42.	$\frac{16x^6y^9}{8x^{-5}y^{-11}} =$	
43.	$(2^3 \cdot 4)^{-5} =$	
44.	$(9^{-8})(27^{-2}) =$	



**Applying Properties of Exponents to Generate Equivalent Expressions—Round 1 [KEY]**

**Directions:** Simplify each expression using the laws of exponents. Use the least number of bases possible and only positive exponents. When appropriate, express answers without parentheses or as equal to 1. All letters denote numbers.

1.	$4^5 \cdot 4^{-4} =$	$4^1$
2.	$4^5 \cdot 4^{-3} =$	$4^2$
3.	$4^5 \cdot 4^{-2} =$	$4^3$
4.	$7^{-4} \cdot 7^{11} =$	$7^7$
5.	$7^{-4} \cdot 7^{10} =$	$7^6$
6.	$7^{-4} \cdot 7^9 =$	$7^5$
7.	$9^{-4} \cdot 9^{-3} =$	$\frac{1}{9^7}$
8.	$9^{-4} \cdot 9^{-2} =$	$\frac{1}{9^6}$
9.	$9^{-4} \cdot 9^{-1} =$	$\frac{1}{9^5}$
10.	$9^{-4} \cdot 9^0 =$	$\frac{1}{9^4}$
11.	$5^0 \cdot 5^1 =$	$5^1$
12.	$5^0 \cdot 5^2 =$	$5^2$
13.	$5^0 \cdot 5^3 =$	$5^3$
14.	$(12^3)^9 =$	$12^{27}$
15.	$(12^3)^{10} =$	$12^{30}$
16.	$(12^3)^{11} =$	$12^{33}$
17.	$(7^{-3})^{-8} =$	$7^{24}$
18.	$(7^{-3})^{-9} =$	$7^{27}$
19.	$(7^{-3})^{-10} =$	$7^{30}$
20.	$\left(\frac{1}{2}\right)^9 =$	$\frac{1}{2^9}$
21.	$\left(\frac{1}{2}\right)^8 =$	$\frac{1}{2^8}$
22.	$\left(\frac{1}{2}\right)^7 =$	$\frac{1}{2^7}$

23.	$\left(\frac{1}{2}\right)^6 =$	$\frac{1}{2^6}$
24.	$(3x)^5 =$	$3^5x^5$
25.	$(3x)^7 =$	$3^7x^7$
26.	$(3x)^9 =$	$3^9x^9$
27.	$(8^{-2})^3 =$	$\frac{1}{8^6}$
28.	$(8^{-3})^3 =$	$\frac{1}{8^9}$
29.	$(8^{-4})^3 =$	$\frac{1}{8^{12}}$
30.	$(22^0)^{50} =$	$1$
31.	$(22^0)^{55} =$	$1$
32.	$(22^0)^{60} =$	$1$
33.	$\left(\frac{1}{11}\right)^{-5} =$	$11^5$
34.	$\left(\frac{1}{11}\right)^{-6} =$	$11^6$
35.	$\left(\frac{1}{11}\right)^{-7} =$	$11^7$
36.	$\frac{56^{-23}}{56^{-34}} =$	$56^{11}$
37.	$\frac{87^{-12}}{87^{-34}} =$	$87^{22}$
38.	$\frac{23^{-15}}{23^{-17}} =$	$23^2$
39.	$(-2)^{-12} \cdot (-2)^1 =$	$\frac{1}{(-2)^{11}}$
40.	$\frac{2y}{y^3} =$	$\frac{2}{y^2}$
41.	$\frac{5xy^7}{15x^7y} =$	$\frac{y^6}{3x^6}$
42.	$\frac{16x^6y^9}{8x^{-5}y^{-11}} =$	$2x^{11}y^{20}$
43.	$(2^3 \cdot 4)^{-5} =$	$\frac{1}{2^{25}}$
44.	$(9^{-8})(27^{-2}) =$	$\frac{1}{3^{22}}$



Number Correct: \_\_\_\_\_

Improvement: \_\_\_\_\_

### Applying Properties of Exponents to Generate Equivalent Expressions—Round 2

**Directions:** Simplify each expression using the laws of exponents. Use the least number of bases possible and only positive exponents. When appropriate, express answers without parentheses or as equal to 1. All letters denote numbers.

1.	$11^5 \cdot 11^{-4} =$	
2.	$11^5 \cdot 11^{-3} =$	
3.	$11^5 \cdot 11^{-2} =$	
4.	$7^{-7} \cdot 7^9 =$	
5.	$7^{-8} \cdot 7^9 =$	
6.	$7^{-9} \cdot 7^9 =$	
7.	$(-6)^{-4} \cdot (-6)^{-3} =$	
8.	$(-6)^{-4} \cdot (-6)^{-2} =$	
9.	$(-6)^{-4} \cdot (-6)^{-1} =$	
10.	$(-6)^{-4} \cdot (-6)^0 =$	
11.	$x^0 \cdot x^1 =$	
12.	$x^0 \cdot x^2 =$	
13.	$x^0 \cdot x^3 =$	
14.	$(12^5)^9 =$	
15.	$(12^6)^9 =$	
16.	$(12^7)^9 =$	
17.	$(7^{-3})^{-4} =$	
18.	$(7^{-4})^{-4} =$	
19.	$(7^{-5})^{-4} =$	
20.	$\left(\frac{3}{7}\right)^8 =$	
21.	$\left(\frac{3}{7}\right)^7 =$	
22.	$\left(\frac{3}{7}\right)^6 =$	

23.	$\left(\frac{3}{7}\right)^5 =$	
24.	$(18xy)^5 =$	
25.	$(18xy)^7 =$	
26.	$(18xy)^9 =$	
27.	$(5.2^{-2})^3 =$	
28.	$(5.2^{-3})^3 =$	
29.	$(5.2^{-4})^3 =$	
30.	$(22^6)^0 =$	
31.	$(22^{12})^0 =$	
32.	$(22^{18})^0 =$	
33.	$\left(\frac{4}{5}\right)^{-5} =$	
34.	$\left(\frac{4}{5}\right)^{-6} =$	
35.	$\left(\frac{4}{5}\right)^{-7} =$	
36.	$\left(\frac{6^{-2}}{7^5}\right)^{-11} =$	
37.	$\left(\frac{6^{-2}}{7^5}\right)^{-12} =$	
38.	$\left(\frac{6^{-2}}{7^5}\right)^{-13} =$	
39.	$\left(\frac{6^{-2}}{7^5}\right)^{-15} =$	
40.	$\frac{42ab^{10}}{14a^{-9}b} =$	
41.	$\frac{5xy^7}{25x^7y} =$	
42.	$\frac{22a^{15}b^{32}}{121ab^{-5}} =$	
43.	$(7^{-8} \cdot 49)^{-5} =$	
44.	$(36^9)(216^{-2}) =$	

**Applying Properties of Exponents to Generate Equivalent Expressions—Round 2 [KEY]**

**Directions:** Simplify each expression using the laws of exponents. Use the least number of bases possible and only positive exponents. When appropriate, express answers without parentheses or as equal to 1. All letters denote numbers.

1.	$11^5 \cdot 11^{-4} =$	$11^1$
2.	$11^5 \cdot 11^{-3} =$	$11^2$
3.	$11^5 \cdot 11^{-2} =$	$11^3$
4.	$7^{-7} \cdot 7^9 =$	$7^2$
5.	$7^{-8} \cdot 7^9 =$	$7^1$
6.	$7^{-9} \cdot 7^9 =$	$1$
7.	$(-6)^{-4} \cdot (-6)^{-3} =$	$\frac{1}{(-6)^7}$
8.	$(-6)^{-4} \cdot (-6)^{-2} =$	$\frac{1}{(-6)^6}$
9.	$(-6)^{-4} \cdot (-6)^{-1} =$	$\frac{1}{(-6)^5}$
10.	$(-6)^{-4} \cdot (-6)^0 =$	$\frac{1}{(-6)^4}$
11.	$x^0 \cdot x^1 =$	$x^1$
12.	$x^0 \cdot x^2 =$	$x^2$
13.	$x^0 \cdot x^3 =$	$x^3$
14.	$(12^5)^9 =$	$12^{45}$
15.	$(12^6)^9 =$	$12^{54}$
16.	$(12^7)^9 =$	$12^{63}$
17.	$(7^{-3})^{-4} =$	$7^{12}$
18.	$(7^{-4})^{-4} =$	$7^{16}$
19.	$(7^{-5})^{-4} =$	$7^{20}$
20.	$\left(\frac{3}{7}\right)^8 =$	$\frac{3^8}{7^8}$
21.	$\left(\frac{3}{7}\right)^7 =$	$\frac{3^7}{7^7}$
22.	$\left(\frac{3}{7}\right)^6 =$	$\frac{3^6}{7^6}$

23.	$\left(\frac{3}{7}\right)^5 =$	$\frac{3^5}{7^5}$
24.	$(18xy)^5 =$	$18^5 x^5 y^5$
25.	$(18xy)^7 =$	$18^7 x^7 y^7$
26.	$(18xy)^9 =$	$18^9 x^9 y^9$
27.	$(5.2^{-2})^3 =$	$\frac{1}{(5.2)^6}$
28.	$(5.2^{-3})^3 =$	$\frac{1}{(5.2)^9}$
29.	$(5.2^{-4})^3 =$	$\frac{1}{(5.2)^{12}}$
30.	$(22^6)^0 =$	$1$
31.	$(22^{12})^0 =$	$1$
32.	$(22^{18})^0 =$	$1$
33.	$\left(\frac{4}{5}\right)^{-5} =$	$\frac{5^5}{4^5}$
34.	$\left(\frac{4}{5}\right)^{-6} =$	$\frac{5^6}{4^6}$
35.	$\left(\frac{4}{5}\right)^{-7} =$	$\frac{5^7}{4^7}$
36.	$\left(\frac{6^{-2}}{7^5}\right)^{-11} =$	$6^{22} 7^{55}$
37.	$\left(\frac{6^{-2}}{7^5}\right)^{-12} =$	$6^{24} 7^{60}$
38.	$\left(\frac{6^{-2}}{7^5}\right)^{-13} =$	$6^{26} 7^{65}$
39.	$\left(\frac{6^{-2}}{7^5}\right)^{-15} =$	$6^{30} 7^{75}$
40.	$\frac{42ab^{10}}{14a^{-9}b} =$	$3a^{10}b^9$
41.	$\frac{5xy^7}{25x^7y} =$	$\frac{y^6}{5x^6}$
42.	$\frac{22a^{15}b^{32}}{121ab^{-5}} =$	$\frac{2a^{14}b^{37}}{11}$
43.	$(7^{-8} \cdot 49)^{-5} =$	$7^{30}$
44.	$(36^9)(216^{-2}) =$	$6^{12}$