

Negative Exponents Worksheet

Name: _____
Date: _____

Practice

1. Write each power with a positive exponent.

a) 9^{-8} b) 1^{-4} c) $(0.5)^{-6}$
d) $(-7)^{-6}$ e) $\frac{1}{5^{-4}}$ f) $\frac{1}{(-3)^{-5}}$

2. Write in exponential form.

a) $\frac{1}{8 \times 8}$ b) $\frac{1}{7 \times 7 \times 7}$ c) $\frac{1}{9 \times 9 \times 9 \times 9}$
d) $\frac{1}{4}$ e) $\frac{1}{27}$ f) $\frac{1}{64}$ g) $\frac{1}{243}$

Evaluate.

3. 5^0 4. 2^6 5. 3^{-1}
6. $(-10)^{-3}$ 7. $(0.1)^{-3}$ 8. $(-3)^{-6}$
9. $\frac{1}{3^{-1}}$ 10. $\frac{1}{4^{-2}}$ 11. $\frac{1}{(-3)^{-1}}$

Write each expression as a power.

12. $7^4 \times 7^5$ 13. $9^6 \times 9^{-4}$
14. $8^{-3} \times 8^{-5}$ 15. $6^7 \div 6^3$
16. $5^{-7} \div 5^{-2}$ 17. $4^{-2} \div 4^6$
18. $(3^3)^4$ 19. $(9^{-2})^4$
20. $(8^{-1})^{-5}$ 21. $-(2^{-3})^{-2}$

Write each expression as a power.

22. $2^4 \times 2^{-3} \times 2^2$ 23. $3^{-5} \times 3^{-3} \times 3^2$
24. $5^6 \times 5^{-9} \times 5$ 25. $8^4 \times 8^{-5} \div 8^{-2}$
26. $(-2)^{-4} \times (-2)^{-3} \div (-2)^{-1}$
27. $(-3)^{-6} \div (-3)^{-2} \times (-3)^4$

Evaluate.

28. $3^2 \times 3^2$ 29. $4^7 \div 4^5$
30. $5^2 \times 5^{-4}$ 31. $6^{-2} \div 6^0$
32. $7^{-4} \div 7^{-5}$ 33. $6^{-3} \div 6^{-3}$
34. $\frac{(6^0)^{-4}}{(10^2)^{-2}}$ 35. $\frac{(7^{-3})^0}{(0.1^{-1})^{-2}}$

Evaluate.

36. $2^{-2} \times 2^{-2}$ 37. $3^4 \div 3^5 \times 3$ 38. $3^0 + 3^3$
39. $4^2 - 2^{-1}$ 40. $5^3 + 3^2$
41. $2^{-2} + 5^0$ 42. $2^3 \times 2^{-1} + 5$
43. $(6 - 3)^{-2}$ 44. $(9^0 + 2^0)^{-1}$
45. $\frac{1}{2^{-2}} + \frac{1}{3^{-1}}$ 46. $\frac{2^{-1}}{3^{-1}}$ 47. $\frac{-3^{-2}}{4^{-1}}$

Evaluate.

48. $(\frac{1}{3})^{-1}$ 49. $(\frac{-1}{5})^2$ 50. $(\frac{-7}{8})^0$
51. $(\frac{1}{10})^{-2}$ 52. $(\frac{-2}{3})^{-3}$ 53. $(\frac{-3}{4})^{-2}$

Simplify.

54. $x^4 \times x^3$ 55. $x^{-2} \times x^3$ 56. $y^{-1} \times y^{-3}$
57. $t^8 \div t^4$ 58. $m^6 \div m^{-2}$ 59. $b^{-2} \div b^{-4}$
60. $(m^4)^2$ 61. $(t^{-2})^4$
62. $(y^{-5})^{-2}$ 63. $m^3 \times m^{-2} \times m^4$
64. $\frac{a^{-4} \times a^{-2}}{a^2}$ 65. $\frac{t^4 \times t^3}{t^9}$
66. $y^{-3} \times y^7 \times y^{-5}$ 67. $t^{-4} \div t^{-6} \times t^6$

- 68) a) A virus is 10^{-7} metres long. Write this as a fraction in lowest terms in standard form.
b) A bacteria is 10^{-6} metres long. Write this as a fraction in lowest terms in standard form.
c) Which is larger, a virus or bacteria? How many times larger (make a fraction with the larger on top, and use an exponent law to simplify).

Section 1.11 pp. 38-39

- Practice 1. a) $\frac{1}{9^8}$ b) $\frac{1}{1^4}$ c) $\frac{1}{0.5^6}$ d) $\frac{1}{(-7)^6}$ e) 5^4
 f) $(-3)^5$ 2. a) 8^{-2} b) 7^{-3} c) 9^{-4} d) 2^{-2} e) 3^{-3} f) 2^{-6}
 or 4^{-3} g) 3^{-5} 3. 1 4. 64 5. $\frac{1}{3}$ 6. $\frac{-1}{1000}$ 7. 1000
 8. $\frac{1}{729}$ 9. 3 10. 16 11. -3 12. 7^9 13. 9^2
 14. 8^{-8} 15. 6^4 16. 5^{-5} 17. $\frac{1}{4^8}$ 18. 3^{12} 19. $\frac{1}{9^8}$
 20. 8^5 21. -2^6 22. 2^3 23. $\frac{1}{3^6}$ 24. 5^{-2} 25. 8^1
 26. $(-2)^{-6}$ 27. $(-3)^0 = 1$ 28. 81 29. 16 30. $\frac{1}{25}$
 31. $\frac{1}{36}$ 32. 7 33. 1 34. 10 000 35. 100 36. $\frac{1}{16}$
 37. 1 38. 28 39. 15.5 40. 134 41. $\frac{5}{4}$ 42. 9
 43. $\frac{1}{9}$ 44. $\frac{1}{2}$ 45. 7 46. $\frac{3}{2}$ 47. $\frac{4}{9}$ 48. 3 49. $\frac{1}{25}$
 50. 1 51. 100 52. $-\frac{27}{8}$ 53. $\frac{16}{9}$ 54. x^7 55. x
 56. y^{-4} 57. t^4 58. m^8 59. b^2 60. m^8 61. t^{-8}
 62. y^{10} 63. m^5 64. a^{-8} 65. t^{-2} 66. y^{-1} 67. t^8

68 a) $\frac{1}{10000000}$

b) $\frac{1}{1000000}$

c) $\frac{10^{-6}}{10^{-7}} = 10^1$

bacteria is
10 times larger