

HW 4-2 - Powers & Exponents

Write each expression using exponents.

1. $(-5)(-5)(-5)(-5)$

2. $3 \cdot 3 \cdot 5 \cdot q \cdot q \cdot q$

3. $m \cdot m \cdot m \cdot m \cdot m$

Evaluate each expression.

4. $(-9)^4$

5. $\left(\frac{1}{3}\right)^4$

6. $\left(\frac{5}{7}\right)^3$

7. In the United States, nearly $8 \cdot 10^9$ text messages are sent every month. About how many text messages is this?



8. Interstate 70 stretches almost $2^3 \cdot 5^2 \cdot 11$ miles across the United States. About how many miles long is Interstate 70?

Evaluate each expression.

9. $g^5 - h^3$, if $g = 2$ and $h = 7$

10. $c^2 + d^3$, if $c = 8$ and $d = -3$

11. $a^2 \cdot b^6$, if $a = \frac{1}{2}$ and $b = 2$

12. $(r - s)^3 + r^2$, if $r = -3$ and $s = -4$

13. The metric system is based on powers of 10. For example, one kilometer is equal to 1,000 meters or 10^3 meters. Write each measurement in meters as a power of 10.

a. megameter (1,000,000 meters)

b. gigameter (1,000,000,000 meters)

c. pentameter (1,000,000,000,000,000 meters)

14. Which expression is equivalent to the expression below?

$$2^3 \cdot 3^4$$

(A) $3 \cdot 3 \cdot 4 \cdot 4 \cdot 4$

(C) $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

(B) $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3$

(D) $6 \cdot 12$

Write each expression using exponents.

15. $\left(-\frac{5}{6}\right)\left(-\frac{5}{6}\right)\left(-\frac{5}{6}\right)$

16. $s \cdot (7) \cdot s \cdot (7) \cdot (7)$

17. $4 \cdot b \cdot b \cdot 4 \cdot b \cdot b$

Evaluate each expression.

18. $k^4 \cdot m$, if $k = 3$ and $m = \frac{5}{6}$

19. $(c^3 + d^4)^2 - (c + d)^3$, if $c = -1$ and $d = 2$

Fill in each with $<$, $>$, or $=$ to make a true statement.

20. $(6 - 2)^2 + 3 \cdot 4$ 5^2

21. $5 + 7^2 + 3^3$ 3^4

22. $\left(\frac{1}{2}\right)^4$ $\left(\frac{1}{4}\right)^2$

23. What is the value of $x^2 - y^4$ if $x = -3$ and $y = -2$?

(F) -7

(H) 2

(G) -2

(I) 7

Simplify each exponent.

24. -4^2

25. -2^3

26. $(-3)^3$

27. $(-3)^4$

Simplify each exponent.

28. -9^2

29. $(-9)^2$

30. What do you notice about the answers to questions #28 & 29?

31. Even though -8^3 and $(-8)^3$ are not the same problem, why are they equal?

Use the order of operations to evaluate.

32. $\frac{x^2}{3}$ when $x = -9$

33. $x^2 + 2x + 7$ when $x = -5$

34. $\frac{c^3}{2}$ when $c = -2$

35. $|x^2 - y| + 2$ when $x = -3$ and $y = 11$