

Unit 2 Review - Chapter 10: Exponents and Scientific Notation

Section 10.1- Exponents

Evaluate the expression.

1. $(-5)^4$

$$\begin{array}{r} 25 \\ \cdot 25 \\ \hline 625 \end{array}$$

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

$$\begin{array}{r} 1 \\ \cdot 1 \\ \cdot 1 \\ \hline 1 \\ \hline 64 \end{array}$$

3. $2 + 7 \times (-3)^2$

$$\begin{array}{r} 2 + 7 \cdot 9 \\ 2 + 63 \\ 65 \end{array}$$

4. Describe how the expression $(-6)^2$ is different from the expression -6^2 :

Section 10.2 and 10.3 – Product and Quotient of Powers Property

Simplify the expression. Write your answer as a power.

5. $(-6)^5 \cdot (-6)^4$

$$(-6)^9$$

6. $(y^{10})^{20}$

Simplify the expression.

7. $\frac{-5}{(-5)^4}$

$$\frac{-5}{625} = -\frac{1}{125}$$

8. $\left|\frac{1}{4}(8 - 4^0 \cdot 4^2)\right|$

9. $\left(-\frac{2n^2}{3}\right)^4$

10. $\frac{x^{12}y^8}{3^3x^5y^9}$

$$\frac{(-1)^4 \cdot 2^4 \cdot n^8}{3^4} = \frac{1 \cdot 16 \cdot n^8}{81} = \frac{16 \cdot n^8}{81}$$

Section 10.4- Zero and negative Exponents

Simplify. Write the expression using only positive exponents.

11. $19x^{-4} \cdot x^{-2}$

12. $\frac{15c^{10}}{25c^{18}}$

13. $3t^{-6} \cdot 8t^6$

$$\frac{19}{x^6}$$

$$\begin{array}{l} 3 \cdot t^{-6} \cdot 8 \cdot t^6 = 24 \\ 3 \cdot 8 \cdot 1 \\ 24 \end{array}$$

14. $7m^{-2} \cdot n^3$

15. $\frac{16m^{-5}}{m^{-8}}$
 $16m^3$

16. $\frac{(ab)^{-3}}{a^2}$

Section 10.5 and 10.6- Reading and Writing Scientific Notation

Tell whether the number is written in scientific notation. Explain.

17. 14×10^8

No, because it has to be ≥ 1 or ≤ 10 . 14 is greater than 10.

18. 4.79×10^{-8}

Write the number in standard form.

19. 2×10^{-5}

~~0.00002~~ 0.00002

20. 3.7×10^6

21. 4.12×10^{-3}

0.00412

22. 7.62×10^{10}

23. Light travels at 3×10^8 meters per second. How far has light traveled after 5 seconds? Write your answer in:

a. scientific notation

$(3 \cdot 10^8) \cdot 5$

$3 \cdot 5 \cdot 10^8$

$15 \cdot 10^8$

$1.5 \cdot 10^9$

b. standard form

~~150,000,000~~

1,500,000,000

Write the number in scientific notation.

24. 9,600,000

25. 0.0027

$2.7 \cdot 10^{-3}$

26. A patient has 0.0000075 gram of iron in 1 liter of blood. The normal level is between 6×10^{-7} gram and 1.6×10^{-5} gram. Is the patient's iron level normal? Write the patient's amount of iron in scientific notation.

Section 10.7- Operations in Scientific Notation

Evaluate and write your answer in scientific notation.

27. $(6.7 \times 10^5) - (4.3 \times 10^5)$

$$2.4 \cdot 10^5$$

28. $(8.9 \times 10^{-3}) - (1.9 \times 10^{-3})$

29. $(2 \times 10^4) + (7.2 \times 10^5)$

$$2 + 72$$

$$74 \cdot 10^4$$

$$7.4 \cdot 10^5$$

30. $(3.2 \times 10^{-3}) + (9.4 \times 10^{-2})$

31. $(6 \times 10^8) \times (4 \times 10^6)$

$$24 \cdot 10^{14}$$

$$2.4 \cdot 10^{15}$$

32. $(9 \times 10^{-3}) \times (9 \times 10^{-3})$

33. $(8 \times 10^3) \div (2 \times 10^2)$

$$4 \cdot 10^1$$

34. $(2.34 \times 10^5) \div (7.8 \times 10^5)$

35. How many times greater is the radius of a basketball than the radius of a marble?



Radius = 1.143×10^1 cm



Radius = 5×10^{-1} cm

$$\frac{1.143 \cdot 10^1}{5 \cdot 10^{-1}}$$

$$10^{1 - (-1)} = 10^2$$

$$5 \overline{) 1.1430}$$

$$\begin{array}{r} 0.2286 \\ -1.00 \\ \hline 143 \\ -100 \\ \hline 430 \\ -400 \\ \hline 30 \end{array}$$

$0.2286 \cdot 10^2$
 22.86 times
 greater than
 the radius
 of a basket ball.

36. The surface of the Earth measures 1.969×10^8 square miles. If 70% of the Earth's surface is covered by water, how much water covers the Earth?