

Exponents and Scientific Notation Review

Evaluate the expression.

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

2) 2^5

3) $(-3)^4$

4) $\frac{1}{3}(2^4 + 2)$

5) $9^2 - 4^3$

6) $\frac{3}{4^2} + \frac{5}{2^3}$

- 7) A new television program attracts 1.1 times as many viewers each week as the week before.
- If 2 million people watch the premiere, how many watch the week after that?
 - Write and evaluate an expression to find the number of viewers 4 weeks after the premiere. Round to the nearest tenth of a million.
- 8) The distance traveled by a falling rock is modeled by $d = 5t^2$, where d is the distance in meters and t is the time in seconds.
- Write and simplify an expression for the distance the rock falls in $2t$ seconds. Is it twice as far? Explain your reasoning.
 - The rock falls 15 meters in t seconds. How far does it fall in $2t$ seconds?

Evaluate the expression.

9) $(3x)^4$

10) $\frac{2^5}{2^4}$

11) $\frac{(4a)^3}{a^5}$

12) $\frac{3^3 x^2}{3x}$

13) $(4x^2)(2xy)^3$

14) $w^3(w^2 \cdot w^5)$

15) A pollen grain is $\frac{3}{10^3}$ centimeters wide. In an illustration, the pollen grain is 6 centimeters wide. How much larger is the illustration than the actual pollen?

16) There is 10^{-3} gram in a milligram, and there are 10^6 grams in a metric ton. How many metric tons are there in a milligram?

Simplify. Write the expression using only positive exponents.

17) $8w^{-5}$

18) $2x^{-3} \cdot 5x^{-7}$

19) $\frac{(2g)^{-3}}{(fg)^2}$

Write the number in standard form.

20) 5×10^4

21) 7.9×10^{-4}

22) 6.999×10^{10}

Evaluate the expression. Write your answer in scientific notation.

23) $(7.5 \times 10^{-3}) + (5.8 \times 10^{-3})$

24) $(4.6 \times 10^6) - (8.3 \times 10^5)$

25) $(1.1 \times 10^8) \times (1.4 \times 10^7)$

26) $(1.6 \times 10^{-4}) \div (8 \times 10^3)$

27) A blue star has a temperature between $36,000^\circ\text{F}$ and $90,000^\circ\text{F}$.

a. Write the temperature range using scientific notation.

b. Is a star with temperature 8.8×10^3 degrees Fahrenheit *warmer* or *cooler* than a blue star?

28) The diameter of a white dwarf is 1.0×10^{-1} times the diameter of our Sun. The Sun is 1.4×10^6 kilometers wide. How wide is the white dwarf?

29) Mercury is 3.6×10^6 miles from the Sun. Pluto is 3.6×10^9 miles from the Sun. How many times farther from the Sun is Pluto than Mercury?

30) A gymnasium is 100 yards wide, 150 yards long, and 30 yards tall.

a. Write the dimensions in scientific notation.

b. Find the volume of the building. Write your answer in scientific notation.

c. The cooling system is designed to cool a building up to 5.0×10^5 cubic yards. What size addition could be added to the gym without needing a new cooling system?