

Name Answers Date _____

Exponents and Scientific Notation Review

Evaluate the expression.

1) $\left(\frac{1}{3}\right)^3$ *$\frac{1}{27}$*

2) 2^5 *32*

3) $(-3)^4$ *81*

4) $\frac{1}{3}(2^4 + 2)$
6

5) $9^2 - 4^3$
17

6) $\frac{3}{4^2} + \frac{5}{2^3}$
 $\frac{13}{16}$

7) A new television program attracts 1.1 times as many viewers each week as the week before.

a. If 2 million people watch the premiere, how many watch the week after that?

2.2 million viewers

b. Write and evaluate an expression to find the number of viewers 4 weeks after the premiere. Round to the nearest tenth of a million.

$2(1.1)^4$; 2.9 million viewers

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.

a. Write and simplify an expression for the distance the rock falls in $2t$ seconds. Is it twice as far? Explain your reasoning.

*No. Replace t with $2t$ and simplify: $d = 5(2t)^2$
 $= 20t^2$*

This is 4 times as much as the original distance.

b. The rock falls 15 meters in t seconds. How far does it fall in $2t$ seconds?

60m

Evaluate the expression.

9) $(3x)^4$ $81x^4$

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

11) $\frac{(4a)^3}{a^5}$ $\frac{64}{a^2}$

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

$9x$

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

$32x^8y^3$

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

w^{10}

- 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?

$2000 \text{ times larger}$

- 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?

10^{-9}

Simplify. Write the expression using only positive exponents.

17) $8w^{-5}$

$\frac{8}{w^5}$

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

$\frac{10}{x^{10}}$

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

$\frac{1}{8f^2g^5}$

Write the number in standard form.

20) 5×10^4

$50,000$

21) 7.9×10^{-4}

0.00079

22) 6.999×10^{10}

$69,990,000,000$

Evaluate the expression. Write your answer in scientific notation.

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

$$1.33 \times 10^{-2}$$

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

$$3.77 \times 10^6$$

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

$$1.54 \times 10^{15}$$

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

$$2 \times 10^{-8}$$

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.

$$3.6 \times 10^4 \text{ to } 9.0 \times 10^4$$

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

Cooler

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?

$$1.4 \times 10^5 \text{ km}$$

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?

1000 times

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

- a. Write the dimensions in scientific notation.

1×10^2 yds by 1.5×10^2 yds by 3×10^1 yd

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

4.5×10^5 yd³

- 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?

50,000 yd³