Algebra 1 (3206)   Name: __KEY__

Final Exam Review Term 3, Chapter 8

●

Write each number in scientific notation:

1. 52,000,000

5.2×10^7

2. .000000002

2.0×10^{-9}

3. .000125

1.25×10^{-4}

Simplify each expression. Write each answer in scientific notation.

4. $(7.2 \times 10^{-7})(2 \times 10^{-5})$

$14.4 \times 10^{-12}_{+1}$

$\boxed{1.44 \times 10^{-11}}$

5. $(1.6 \times 10^5)(3 \times 10^{11})$

$\boxed{4.8 \times 10^{16}}$

6. $(3 \times 10^8)(2 \times 10^{-4})$

$\boxed{6 \times 10^4}$

7. $(6 \times 10^{-7})(3.2 \times 10^2)$

19.2×10^{-5}

$\boxed{1.92 \times 10^{-4}}$

8. $(2 \times 10^{-3})^3$

$\boxed{8 \times 10^{-9}}$

9. $\dfrac{9.35 \times 10^{-3}}{3.71 \times 10^{-5}}$

$\boxed{2.52 \times 10^2}$

10. $\dfrac{4 \times 10^9}{8 \times 10^3}$

$.5 \times 10^6$

$\boxed{5.0 \times 10^5}$

11. $\dfrac{1.8 \times 10^{-8}}{0.9 \times 10^3}$

$\boxed{2 \times 10^{-11}}$

Simplify each expression.

12. $(x^5y^3)^3(xy^5)^2$

$x^{15}y^9 x^2 y^{10}$

$\boxed{x^{17}y^{19}}$

13. $(3f^4g^{-3})^3(f^2g^{-2})^{-2}$

$27f^{12}g^{-9}f^{-4}g^4$

$27f^8 g^{-5}$

$\boxed{\dfrac{27f^8}{g^5}}$

14. $(-8m^4n^{-3})(4m^{-1}n^{-4})$

$-32m^3 n^{-7}$

$\boxed{\dfrac{-32m^3}{n^7}}$

15. $x^{-9}x^0 x^5 x^2$

$x^{-9}x^7 = x^{-2} = \boxed{\dfrac{1}{x^2}}$

16. $5^{-6}5^4$

$5^{-2} = \dfrac{1}{5^2} = \boxed{\dfrac{1}{25}}$

17. $\dfrac{a^7b^8c^3}{a^4b^{11}c^7}$ $a^3 b^{-3} c^{-4}$

$\boxed{\dfrac{a^3}{b^3c^4}}$

18. $\left(\dfrac{r^{-3}s^2t^{-5}}{r^{-4}s^2t^3}\right)^2$

$\dfrac{r^{-6}s^4t^{-10}}{r^{-8}s^4t^6} = \boxed{\dfrac{r^2}{t^{16}}}$

19. $\left(\dfrac{2x^5y^{-3}z^0}{3x^{-6}y^{-5}z^{-1}}\right)^{-4}\left(\dfrac{3x^{-6}y^{-5}z^{-1}}{2x^5y^{-3}}\right)^{+4}$

$\dfrac{81x^{-24}y^{-20}z^{-4}}{16x^{20}y^{-12}} = \boxed{\dfrac{81\,z^8}{16x^{44}y^8}}$

20. $\dfrac{x^4y^{-8}z^{-2}}{x^{-1}y^6z^{-10}}$

$\boxed{\dfrac{x^5z^8}{y^{14}}}$

21. $n^6(n^{-2})^5$

$n^6 \cdot n^{-10} = n^{-4} = \boxed{\dfrac{1}{n^4}}$

Write an exponential function to model each situation. Find each amount at the end of the specified time. $y = a \cdot b^x$

22. A town with a population of 15,000 grows 3% per year. Find the population at the end of year 10.

$$100\% + 3\% = 103\% = 1.03$$

$$y = 15000 \cdot (1.03)^{10} = 20{,}158.74 \rightarrow \boxed{20{,}158}$$

23. You buy a new computer for $5,000. The computer depreciates in value (loses value) at a rate of 13.5% each year. How much will your computer be worth in 8 years?

$$100\% - 13.5\% = 86.5\%$$
$$.865$$

$$y = 5000(.865)^8 = \boxed{\$1567.11}$$

24. The starting salary for a new employee is $32,500 per year. The salary will increase 8% per year. What will the salary be after 5 years? After 10 years?

$$100\% + 8\% = 108\%$$
$$1.08$$

$$y = 32{,}500(1.08)^5 = \boxed{\$47{,}018.50}$$

$$y = 32{,}500(1.08)^{10} = \boxed{\$70{,}165.06}$$

25. A city of 2,950,000 people has a 2.5% annual decrease in population per year. What will the population be after 7 years?

$$100\% - 2.5\% = 97.5\% \rightarrow .975$$

$$y = 2{,}950{,}000(.975)^7 = \boxed{2{,}470{,}895}$$