

Algebra – Review
Chapter 8 – Exponents

Name Key

Simplify each problem below. Final answers should have positive exponents. Circle your answers.

1. $2^5 \cdot 2^3 = 2^8$
256
or $2^5 \cdot 2^3$
 $32 \cdot 8 = 256$
2. $4^{-3} = \frac{1}{4^3} = \frac{1}{64}$
3. $a^{-8} = \frac{1}{a^8}$
4. $(3c^4)^5$
 $3^5 c^{20}$
243 c²⁰
5. $(3b^6)(4b)(5b^2)$
60 b⁹
6. $m^5(z^0) = 1$
 $m^5 \cdot 1$
m⁵
7. $\frac{x^{15}}{x^9}$
x⁶
8. $\left(\frac{c^6}{y^7}\right)^8 = \frac{c^{48}}{y^{56}}$
9. $\frac{r^8 s^{-10}}{t m^{-2}} = \frac{r^8 m^2}{t s^{10}}$
10. $6x \cdot y^5 \cdot 4x^6 \cdot 2y^8$
48 x⁷ y¹³
11. $(3d^2f)^4(d^7f^7)$
 $3^4 d^8 f^4 d^7 f^7$
81 d¹⁵ f¹¹
12. $(6r^4s^3)(9rs^2)$
54 r⁵ s⁵
13. $\left(\frac{5x^2z^7}{xz^4}\right)^3 = \frac{5^3 x^6 z^{21}}{x^3 z^{12}} = 125 x^3 z^9$
or
 $\left(\frac{5x^2z^7}{xz^4}\right)^3 = (5x^{\cancel{2}3}z^{\cancel{7}3})^3 = 5^3 x^3 z^9 = 125 x^3 z^9$
14. $\frac{x^7 y^9 z^3}{x^4 y^7 z^8} = \frac{x^3 y^2}{z^5}$

Complete the following problems.

15. Write 14,000,000 in scientific notation.

14,000,000
1.4 × 10⁷

16. Write 0.0000052 in scientific notation.

0.0000052
5.2 × 10⁻⁶

Simplify. Write each answer in scientific notation. Circle your answers.

17. $(1.6 \times 10^{11})(0.2 \times 10^{-1})$

320000000000

3.2×10^9

18. $\frac{1.8 \times 10^{15}}{9 \times 10^{-7}}$

2×10^{21}

19. $8(6.3 \times 10^{-4})$

0.00504

5.04×10^{-3}

Complete the following problems.

20. Explain why $y = 0.2(3)^x$ represents exponential growth.

The base of 3 is larger than 1. $3 > 1$

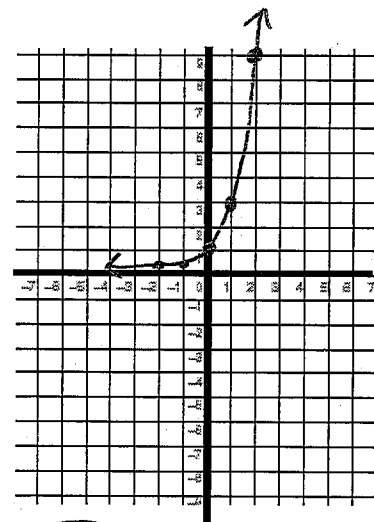
21. Explain why $y = 5(0.8)^x$ represents exponential decay.

The base of 0.8 is larger than 0 and less than 1.
 $0 < 0.8 < 1$

Complete the t-chart for the following exponential functions. Then graph. Determine if the graph represents exponential growth or decay.

21. $y = 3^x$

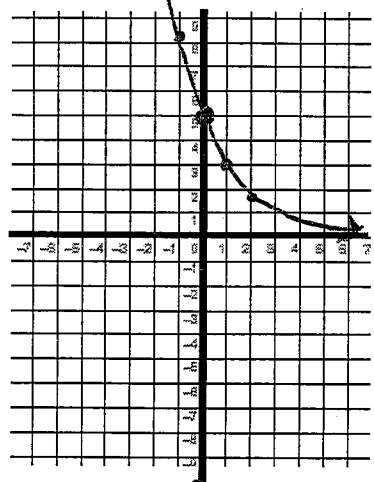
X	3^x	Y
-2	$3^{-2} = 0.\overline{1} = \frac{1}{9}$	$0.\overline{1}$ or $\frac{1}{9}$
-1	$3^{-1} = 0.\overline{3} = \frac{1}{3}$	$0.\overline{3}$ or $\frac{1}{3}$
0	$3^0 = 1$	1
1	$3^1 = 3$	3
2	$3^2 = 9$	9



Growth or decay (circle one)

22. $y = 5 \cdot 0.6^x$

X	$5 \cdot 0.6^x$	Y
-2	$5 \cdot 0.6^{-2} = 5 \cdot 2.\overline{7} = 13.\overline{8}$	$13.\overline{8}$ or $13\frac{8}{9}$
-1	$5 \cdot 0.6^{-1} = 5 \cdot 1.\overline{6} = 8.\overline{3}$	$8.\overline{3}$ or $8\frac{1}{3}$
0	$5 \cdot 0.6^0 = 5 \cdot 1 = 5$	5
1	$5 \cdot 0.6^1 = 5 \cdot 0.6 = 3$	3
2	$5 \cdot 0.6^2 = 5 \cdot 0.36 = 1.8$	1.8 or $1\frac{4}{5}$



Growth or decay (circle one)