Algebra 1 Unit 4 Review Name: Key

For questions 1 – 10, simplify the expression.. Assume the denominator is not equal to zero.

1. $y^5 \cdot y^3$

A) y^2 B) y^8 C) y^{15} D) $2y^8$

2. $(b^4)^3$

A) b^7 B) $3b^4$ C) b^{12} D) $3b^7$

3. $\frac{a^7}{a^4}$

A) a^{11} B) a^{28} C) a^3 D) 1

4. $\frac{m^5r^2}{m^2r^3}$ $\frac{m^3}{r}$

A) m^7r^5 B) $\frac{m^3}{r}$ C) m^3r D) $\frac{r}{m^3}$

5. $(m^4)^2$

A) $6m$ B) m^8 C) m^6 D) $2m^4$

6. $(-2xy^2)^4(2x^3y^4)^2$ $(-2)^4x^4y^8 \cdot (2)^2x^6y^8 = 2^6x^{10}y^{16}$

A) $4x^{24}y^{32}$ B) $-8x^9y^6$ C) $64x^{10}y^{16}$ D) $-4x^{10}y^{16}$

7. $\frac{(z^2w^{-1})^3}{(z^3w^2)^2}$ $\frac{z^6w^{-3}}{z^6w^4}$ $\frac{1}{w^7}$

A) $\frac{1}{w^7}$ B) $\frac{z^{12}}{w^7}$ C) w D) $\frac{1}{w}$

8. $\frac{(a^{-2}b^4)^{-6}}{(a^4b^{-8})^3}$ $\frac{a^{12}b^{-24}}{a^{12}b^{-24}}$

A) ab^3 B) 1 C) $\frac{a^{24}}{b^{48}}$ D) $\frac{b^{48}}{a^{24}}$

9. $-\frac{12x^4y^{-3}z}{20x^8y^{-5}z^{-2}}$ $= -\frac{3y^2z^3}{5x^4}$

A) $-\frac{3}{5x^4y^2z^3}$ B) $-\frac{3}{x^4y^8z}$ C) $-\frac{3y^2z^3}{5x^4}$ D) $-\frac{3y^8z}{5x^4}$

10. $\dfrac{(-3x^3y^{-2})^3}{(9x^{-4}y^{-3})^2}$ $\dfrac{(-3)^3 x^9 y^{-6}}{(9)^2 x^{-8} y^{6}} = \dfrac{-27x^{17}}{81} = \dfrac{-x^{17}}{3}$

A) $\dfrac{-x^{14}y^7}{3}$ B) $\dfrac{-x^2y^3}{9}$ C) $\dfrac{-x}{y^{12}}$ D) $\dfrac{-x^{17}}{3}$

11. Write $6x^{\frac{1}{2}}$ in radical form.

A) $\sqrt{6x}$ B) $6\sqrt{x}$ C) $6\sqrt{6x}$ D) $x\sqrt{6}$

12. Write $(12y)^{\frac{1}{2}}$ in radical form.

A) $12\sqrt{y}$ B) $\sqrt{12y}$ C) $12\sqrt{12y}$ D) $y\sqrt{12}$

13. Evaluate $16^{\frac{3}{4}}$

A) 2 B) 4 C) 8 D) 32

14. Evaluate $729^{\frac{2}{3}}$

A) 27 B) 9 C) 486 D) 81

15. Solve: $3^{x+2} = 81$

A) 0 B) 1 C) 2 D) 3

$3^{x+2} = 3^4$

16. Solve: $216 = 6^{x+1}$

A) 2 B) 1 C) 4 D) 3

$6^3 = 6^{x+1}$

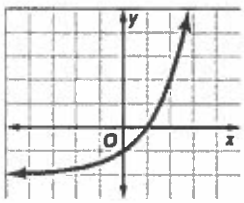
17. Which equation represents exponential decay?

A) $y = 0.5x^3$ B) $y = 0.5x^2 - x$ C) $y = 0.5(1.07)^x$ D) $y = 0.5(.87)^x$

18. Which equation represents exponential growth?

A) $y = 2x^3$ B) $y = \frac{1}{3}x^2 - x$ C) $y = 2{,}000(0.82)^x$ D) $y = 2{,}000(1.82)^x$

19. Which equation corresponds to the graph shown?

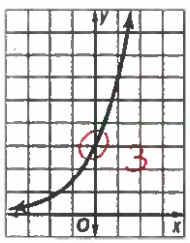


growth so A or B

A) $y = 2^x + 2$ B) $y = 2^x - 2$

C) $y = \left(\frac{1}{2}\right)^x - 2$ D) $y = \left(\frac{1}{2}\right)^x + 2$

20. Which equation corresponds to the graph shown?



A) $y = 3(2)^x$ B) $y = 2(3)^x$

C) $y = 3(2)^x - 1$ D) $y = 3(2)^x + 1$

21. If $y = 10(2.5)^t$ represents the number of bacteria in a culture at time t, how many will there be at time $t = 6$?

A) 2441 B) 244 C) 24 D) none

22. A \$60,000 piece of machinery depreciates in value at a rate of 11% per year. About what will its value be in 5 years?

A) \$47,526 B) \$42,298 C) \$33,504 D) \$37,645

$60{,}000(.89)^5$

23. The Mendoza family just bought a house for \$180,000. If the value of the house increases at a rate of 3% per year, about how much will it be worth in 10 years?

A) \$258,000 B) \$241,905 C) \$234,000 D) \$250,000

$180{,}000(1.03)^{10}$

24. If a \$5000 piece of equipment loses value at a rate of 0.5% per year, which equation represents the value after 5 years?

$5000(1-.005)^5$

A) $y = 5000(5)^5$ B) $y = 5000(.995)^5$ C) $y = 5000(1.05)^5$ D) $y = 5000(.95)^5$

25. Each year, new computers are built with better technology, making older ones less valuable. If the computers loses value at a rate of 2.5% per year, how much will a \$1500 computer be worth in ten years?

A) \$1165 B) \$1920 C) \$84.47 D) \$13970 $1500(.975)^{10}$

26. Which statement best describes the equation $y = A(3.2)^x$, where A represents the initial value and x represents time in years?

$A(1+2.2)^x$

A) y represents exponential decay of 2.2% B) y represents growth of 22%

B) y represents exponential growth of 220% C) y represents growth of 3.2%

27. Which expression is equivalent to $(\sqrt[6]{x})^5$ in exponential form?

A) $6^{\frac{5}{x}}$ B) $5^{\frac{x}{6}}$ C) $x^{\frac{5}{6}}$ D) $x^{\frac{6}{5}}$

$x^{5/6}$

28. In the year 2000, a scientist determined there where 1500 of a certain type of deer in a forest preserve. The table shows the deer increased exponentially at a rate of 5% each year.

Number of Years since 2000 (t)	Deer Population (N)
0	1500
1	1575
2	1654

$\times 1.05$

Based on on this information, which equation can be used to predict the deer population 3 years after 2000?

A) $N = 1500(1.5)^3$ B) $N = 1500(.95)^3$ C) $N = 1500(1.05)^3$ D) $N = 1500(.5)^3$

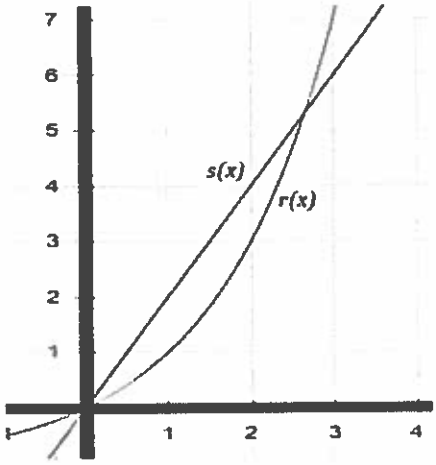
29. In the graph, $s(x)$ is a linear function and $r(x)$ is exponential. Which statement best explains the behavior of the graphs of the functions as x increases?

A) $r(x)$ eventually exceeds $s(x)$ because rate of change of $s(x)$ increases, where as the rate of change of $r(x)$ is constant.

B) $r(x)$ eventually exceeds $s(x)$ because the rate of change of $r(x)$ increased as x increases, whereas the rate of change of $s(x)$ is constant.

C) $s(x)$ eventually exceeds $r(x)$ because rate of change of $r(x)$ increases, Where as the rate of change of $s(x)$ is constant.

D) $s(x)$ eventually exceeds $r(x)$ because rate of change of $s(x)$ increases, Where as the rate of change of $r(x)$ is constant.



30. Samuel won a contest where he wins a yearly prize for his lifetime. Samuel can choose to be paid \$5000 per year (option 1 in the table below) or his payments can be tripled each year, with the first year the payment starting at \$100. (Assume Samuel is 15 and will live to be 100 years old)

$y = 5000x$ $y = 100(3)^{x-1}$

Year	Option 1	Option 2
1	\$5000	\$100
2	\$5000	\$300
3	\$5000	\$900

\$425,000

Which prize option should Samuel choose in order to earn the most money over his lifetime?

A) Option 1 because the total payment is increasing exponentially

B) Option 1 because the total payment is increasing linearly

C) Option 2 because the total payment is increasing exponentially

D) Option 2 because the total payment is increasing linearly

31. The graph and table for $y = \left(\frac{1}{4}\right)^x$ is shown. What is the domain and range?

A) D: $x > 0$, R: $y > 0$

B) D: $y > 0$, R: All Real Numbers

C) D: All Real Numbers, R: All Real Numbers

D) D: All Real Numbers, R: $y > 0$

x	y
–2	16
–1	4
0	1
1	$\frac{1}{4}$
2	$\frac{1}{16}$