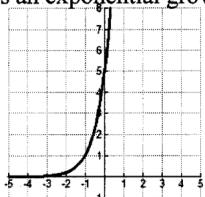


II Key

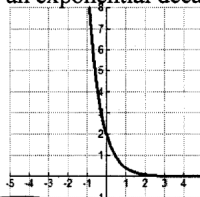
Multiple Choice

1 The function $y = 2(.5)^x$ is a growth or decay? Choose the graph of the function.

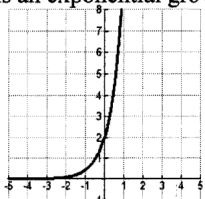
a. This is an exponential growth function.



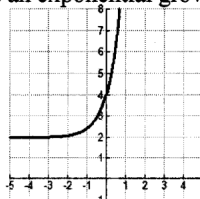
c. This is an exponential decay function.



b. This is an exponential growth function.



d. This is an exponential growth function.



2. Write the exponential equation $5^2 = 25$ in logarithmic form.

a. $\log_5 25 = 2$

b. $\log_2 5 = 25$

c. $\log_5 2 = 25$

d. $\log_{25} 2 = 5$

3. Write the logarithmic equation $\log_2 16 = 4$ in exponential form.

a. $2^{16} = 4$

b. $4^2 = 16$

c. $2^{-4} = 16$

d. $2^4 = 16$

4. A bacteria population starts at 3,000 and decreases at about 12% per day. Write a function representing the number of bacteria present each day. After how many days will there be fewer than 500 bacteria?

a. $f(t) = 3000(0.88)^t$
14 days

b. $f(t) = 3000(0.12)^t$
0.85 days

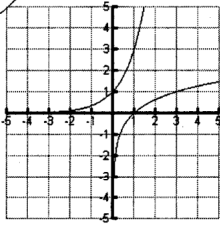
c. $f(t) = 3000(0.12)^t$
1.3 days

d. $f(t) = 3000(0.88)^t$
0.18 days

Key - II

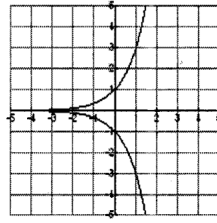
5. Choose the graph of the function $f(x) = 3^x$ and its inverse. State the equation of the inverse of $f(x) = 3^x$.

a.



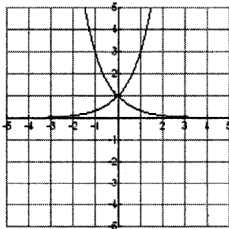
$$f^{-1}(x) = \log_3 x$$

b.



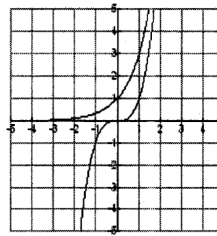
$$f^{-1}(x) = -3^x$$

c.



$$f^{-1}(x) = 3^{-x}$$

d.



$$f^{-1}(x) = x^3$$

6. The amount of money in a bank account can be expressed by the exponential equation $A = 300(1 + \frac{.032}{4})^{4t}$ where A is the amount in dollars and t is the time in years. About how many years will it take for the amount in the account to be more than \$900?

a. 3 years

b. 19 years

c. 35 years

d. 121 years

7. Solve $5^{6x} = 125$

a. $x = \frac{1}{2}$

b. $x = 9$

c. $x = 2$

d. $x = 4$

8. Solve $\frac{x^2 + 3x - 10}{x - 2} = 7$. Check your answer.

a. $x = 5$

b. $x = 7$

c. $x = 2$

d. no solution

KEY - II

9. Simplify the expression $\sqrt[3]{125x^{12}}$. Assume that all variables are positive.

a. $25x^4$

b. $5x^9$

c. $\sqrt[3]{125x^4}$

d. $5x^4$

10. Write the expression $16^{\frac{3}{4}}$ in radical form, and simplify. Round to the nearest whole number if necessary.

a. $(\sqrt[3]{16})^4 = 40$

b. $\sqrt[4]{3} = 4$

c. $(\sqrt[4]{16})^3 = 8$

d. $(\sqrt{16})^3 = 64$

11. Write the expression $\sqrt[7]{5^4}$ by using rational exponents.

a. $5^{\frac{7}{4}}$

b. $5^{\frac{4}{7}}$

c. 5^{-3}

d. 5^3

12. Solve $-1 + \sqrt{x+21} = x$.

a. $x = -5$

b. $x = 4$ or $x = -5$

c. $x = 4$

d. no solution

13. Solve $3\sqrt{2x-5} = 21$

a. $x = 27$

b. ± 27

c. $x = \frac{5 \pm \sqrt{7}}{2}$

d. no solution

14. Given $f(x) = 3x^2 - 5x + 6$ and $g(x) = -2x + 3$, find $(f-g)(x)$.

a. $3x^2 - 3x + 9$

b. $-3x^2 + 3x - 3$

c. $3x^2 - 7x + 3$

d. $3x^2 - 3x + 3$

15. Given $f(x) = 4x^2 + 3x - 5$ and $g(x) = 2x - 3$, find $(fg)(x)$.

a. $8x^2 - 12x + 6x + 15$

c. $8x^3 - 6x^2 - 19x + 15$

b. $8x^3 - 12x^2 - 19x + 15$

d. $8x^3 + 6x^2 - 19x + 15$

KEY - II

16. Given $f(x) = x^3 + 1$ and $g(x) = 3x - 2$, find $g(f(2))$.

a. 25

b. 36

c. 28

d. 19

17. Given $f(x) = \sqrt{x+9}$ and $g(x) = \frac{6}{x-9}$. Which of the following is a true statement?

a. $f(0) = -3$

b. $g(9) = 0$

c. 9 is not in the domain of $g(x)$

d. -9 is not in the domain of $f(x)$

18. Solve the equation or formula for the indicated variable. $S = 5r^2\sqrt{t}$. Solve for t .

a. $t = \frac{S}{5r}$

b. $t = \frac{S^2}{25r^4}$

c. $t = \frac{\sqrt{S}}{\sqrt{5r^2}}$

d. $t = \frac{25r^4}{S^2}$

19. Which of the following is *not* equal to $\sqrt[3]{x^{15}}$?

a. $x^{\frac{3}{15}}$

b. $\sqrt[3]{x^{10}}$

c. x^5

d. $x^{\frac{15}{3}}$

20. Which value is equivalent to $5^{\frac{3}{2}}$?

a. $\frac{15}{2}$

b. $\sqrt{15}$

c. $5\sqrt{5}$

d. $\frac{125}{2}$

21. Which exponential function models a population of 100 chickens decreasing at an annual rate of 5%?

a. $y = 100(0.95)^x$

b. $y = 100(0.05)^x$

c. $y = 100(0.05)$

d. $y = 100(1.05)^x$

22. What expression is equal to $\log 30$? Show how you could find the answer without using a calculator.

a. $\ln 30$

b. $\ln 30 - \ln 10$

c. $\ln 30 \div \ln 10$

d. $\ln(50 \div 10)$

23. Simplify $\frac{4}{x^2-9} - \frac{2}{x-3} = 1$

a. $-1 \pm 2\sqrt{2}$

b. $1 \pm 2\sqrt{2}$

c. $-2 \pm 4\sqrt{2}$

d. $2 \pm 4\sqrt{2}$

KEY-II

24. If $f(x) = -x^2 - x + 1$, what is $f(-2)$?

a. -5

b. 9

c. -1

d. 1

25. Give the domain and range of the function:

x	-3	-2	-1	0
y	5	4	0	4

a. Domain: $\{0, 4, 5\}$

Range: $\{-3, -2, -1, 0\}$

b. Domain: $\{-3, -2, -1, 0\}$

Range: $\{0, 4, 5\}$

c. Domain: $\{-3, 0\}$

Range: $\{0, 5\}$

d. Domain: $\{-3, -2, 0\}$

Range: $\{0, 4, 5\}$

26. Evaluate $\log_3 81 = x$.

a. 2

b. 4

c. 8

d. 27

27. Which statement is *not* true about a function f and its inverse f^{-1} ?

a. A rule for f^{-1} can be found by switching x and y .

c. The range of f^{-1} is always the same as the domain of f .

b. A reflection about the line $y = x$ maps the graph of f onto the graph of f^{-1} .

d. A reflection about the y -axis maps the graph of f onto the graph of f^{-1} .

28. Write the expression below using rational exponents. $\sqrt[3]{x^4 y^6}$

a. $x^{\frac{3}{4}} y^{\frac{1}{2}}$

b. $x^{\frac{4}{3}} y^2$

c. $x^{\frac{3}{4}} y^6$

d. $x^{12} y^{18}$

29. Which of the following is equal to $x^{-\frac{2}{5}}$?

a. $\frac{1}{\sqrt[5]{x^2}}$

b. $-\sqrt{x^5}$

c. $-x^3$

d. $-\frac{1}{\sqrt[3]{x^2}}$

30. Solve $\frac{1}{3} + \frac{5}{x} = \frac{17}{6x}$

a. $x = -\frac{13}{2}$

b. $x = \frac{13}{2}$

c. $x = 13$

d. $x = 2$

Key II

31. Which statement is *not* correct?

a. $\log_2 100 = 2 \log_2 10$

c. $\log_5 81 = 4 \log_5 3$

b. $\log_3 16 = 2 \log_3 4$

d. $\log_8 10000 = 3 \log_8 10$

32. Which expression is equal to $3 \log_5 x + \log_5 y - 5 \log_5 z$?

a. $\log_5 (3xy/z^5)$

b. $-\log_5 \frac{3xy}{5z}$

c. $\log_5 \frac{(xy)^3}{z^5}$

d. $\log_5 \frac{x^3 y}{z^5}$

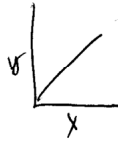
Short Answer / Open Response

33. Determine whether each data set represents a direct variation, an inverse variation, or neither. Show your work to verify.

a.

x	12	14	16	20
y	2	7/3	8/3	10/3

$\frac{y}{x} = \frac{1}{6}$
DIRECT



b.

x	30	15	20	12
y	2	4	3	5

$x \cdot y = 60$

INVERSE



34. Solve the equation $\frac{x+4}{x-2} + \frac{x}{3} = \frac{4}{x-2}$.

$C = 0$
 $C = -1$

35. The money you earn varies directly with the number of lawns you mow. You earn \$36 for mowing three lawns.

Money = ~~600~~ 12 · lawns

a. Write an equation for the relationship between money earned and lawns mowed.

Money = $k \cdot \text{Lawns}$

b. How much money would you earn for mowing seven lawns?

Money = ~~12~~ · 7 = \$84

$36 = k \cdot 3$
 $k = 12$

36. Find the solution of $\log x + \log 20 = 2$.

X = 5