

Practice 03

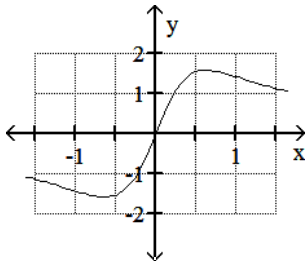
- 4.1 Inverse Functions
- 4.2 Exponential Functions
- 4.3 Logarithmic Functions
- 4.4 Properties of Logarithms
- 4.5 Exponential and Logarithmic Equations and Applications

A relation in x and y is given. Determine if the relation defines y as a one-to-one function of x .

- 1) $\{(-6, 8), -5, -8), (4, -6), (1, 3)\}$ 1) _____
 A) Yes B) No

Determine if the relation defines y as a one-to-one function of x .

- 2) 2) _____



- A) Yes B) No

A one-to-one function is given. Write an expression for the inverse function.

- 3) $f(x) = \frac{6 - x}{2}$ 3) _____

- A) $f^{-1}(x) = 6 - 2x$ B) $f^{-1}(x) = \frac{6 - 2x}{x}$

- 4) $f(x) = \sqrt[3]{x + 7}$ 4) _____

- A) $f^{-1}(x) = (x + 7)^3$ B) $f^{-1}(x) = x^3 - 7$

- 5) $f(x) = \frac{x + 8}{x + 6}$ 5) _____

- A) $f^{-1}(x) = \frac{8 - 6x}{x - 1}$ B) $f^{-1}(x) = \frac{x - 6}{x - 8}$

Solve the problem.

- 6) Given that the domain of a one-to-one function f is $[-8, -1)$ and the range of f is $(8, \infty)$, state the domain and range of f^{-1} . 6) _____
- A) Domain: $(8, \infty)$ B) Domain: $(1, 8]$
 Range: $[-8, -1)$ Range: $(-\infty, -8)$

Find the inverse mentally.

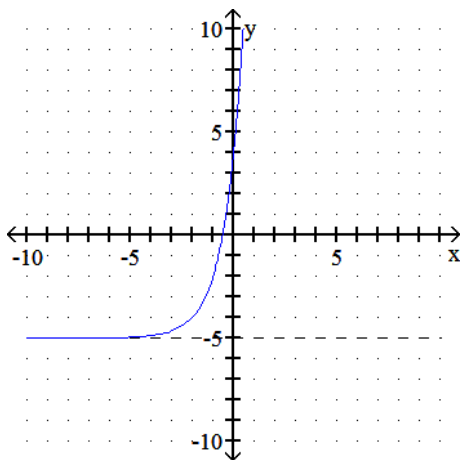
- 7) $f(x) = 7x - 8$ 7) _____
- A) $f^{-1}(x) = 8 - \frac{x}{7}$ B) $f^{-1}(x) = \frac{x + 8}{7}$

Solve the problem.

- 8) Use the graph of $y = 3^x$ to graph the function. Write the domain and range in interval notation. 8) _____

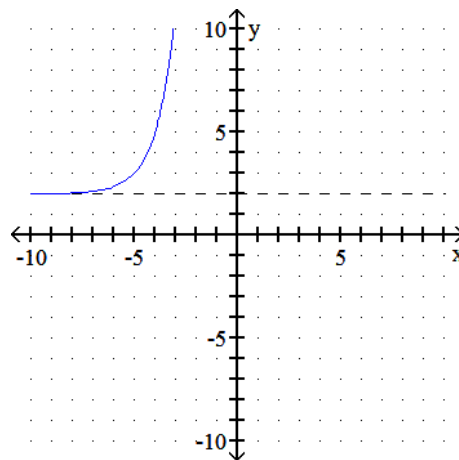
$f(x) = 3^{x+5} + 2$

A)



Domain: $(-\infty, \infty)$
 Range: $(-5, \infty)$

B)



Domain: $(-\infty, \infty)$
 Range: $(2, \infty)$

- 9) Bethany needs to borrow \$8,000. She can borrow money at 6.9% simple interest for 3 yr or she can borrow at 6.5% with interest compounded continuously for 3 yr. Which option results in less total interest? 9) _____
- A) 6.5% compounded continuously results in less total interest
 B) 6.9% simple interest results in less total interest

- 10) The atmospheric pressure on an object decreases as altitude increases. If a is the height (in km) above sea level, then the pressure $P(a)$ (in mmHg) is approximated by $P(a) = 760e^{-0.13a}$. Determine the atmospheric pressure at 7.176 km. Round to the nearest whole unit. 10) _____
- A) 379 mmHg B) 4,789 mmHg C) 261 mmHg D) 299 mmHg

Write the equation in exponential form.

11) $\log_4 16 = 2$

A) $2^4 = 16$

B) $16^2 = 4$

C) $4^2 = 16$

D) $2^{16} = 4$

11) _____

Write the equation in logarithmic form.

12) $3^5 = 243$

A) $\log_5 243 = 3$

B) $\log_{243} 3 = 5$

C) $\log_{243} 5 = 3$

D) $\log_3 243 = 5$

12) _____

Simplify the expression.

13) $\log_2 16$

A) -4

B) 8

C) 4

D) -8

13) _____

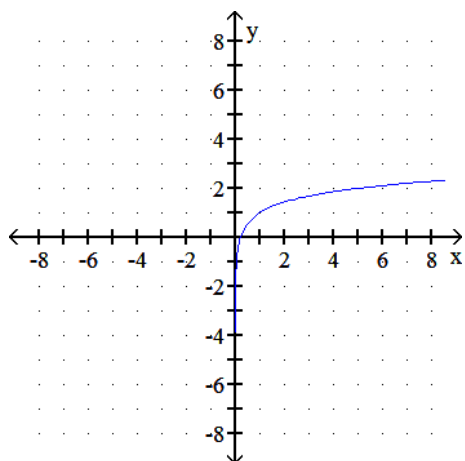
a. Use transformations to graph the function.

b. Write the domain and range in interval notation.

c. Determine the vertical asymptote.

14) $y = 1 + \log_5(x)$

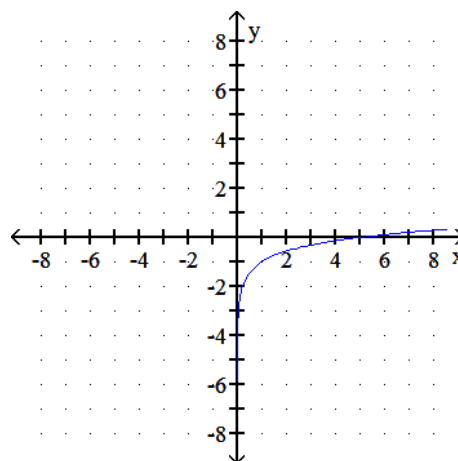
A) a.



b. domain: $(0, \infty)$, range $(-\infty, \infty)$

c. vertical asymptote: $x = 0$

B) a.



b. domain: $(0, \infty)$, range $(-\infty, \infty)$

c. vertical asymptote: $x = 0$

14) _____

Write the domain in interval notation.

15) $f(x) = \log(2 - x)$

A) $(-\infty, 2]$

B) $[2, \infty)$

C) $(0, \infty)$

D) $(-\infty, 2)$

15) _____

16) $f(x) = \log_5(3 - x)^2$

A) $(-\infty, 3) \cup (3, \infty)$

B) $(-3, 3)$

16) _____

Use the product property of logarithms to write the logarithm as a sum of logarithms. Then simplify if possible.

17) $\log(10,000y)$ 17) _____
A) $10,000 \log y$ B) $4 + \log y$

Apply the power property of logarithms.

18) $\ln 10^{kt}$ 18) _____
A) $kt + \ln 10$ B) $kt \ln 10$

Write the logarithm as a sum or difference of logarithms. Simplify each term as much as possible.

19) $\log_5 \frac{a^8}{b^7c}$ 19) _____
A) $8\log_5 a + 7\log_5 b + \log_5 c$ B) $8\log_5 a - 7\log_5 b - \log_5 c$

Write as the sum or difference of logarithms and fully simplify, if possible. Assume the variable represents a positive real number.

20) $\log \left(\frac{\sqrt[3]{ab}}{c^5} \right)$ 20) _____
A) $\frac{1}{3}\log a + \frac{1}{3}\log b - 5\log c$ B) $3\log a + \log b - 5\log c$

Write the logarithmic expression as a single logarithm with coefficient 1, and simplify as much as possible.

21) $5\log_b y + 3\log_b z$ 21) _____
A) $\log_b (y^5 z^3)$ B) $8 \log_b (y + z)$ C) $15 \log_b (yz)$ D) $\log_b (y^5 + z^3)$

Use the change-of-base and a calculator to approximate the logarithm to 4 decimal places.

22) $\log_5 9$ 22) _____
A) 0.7325 B) 0.4394 C) 1.3652 D) 0.1788

Solve the equation.

23) $5^{2z+3} = 625$ 23) _____
A) $\{311\}$ B) $\{4\}$ C) $\left\{\frac{1}{2}\right\}$ D) $\left\{\frac{1}{5}\right\}$

Solve the equation. Write the solution set with the exact values given in terms of natural or common logarithms. Also give approximate solutions to 4 decimal places, if necessary.

24) $4e^{5m-5} - 2 = 14$ 24) _____

A) $\left\{\frac{\ln 4 + 5}{5}\right\}; m = 1.2773$

B) $\left\{\frac{\ln 4 + 5}{\ln 5}\right\}; m = 3.9680$

25) $e^{2x} - 3e^x - 10 = 0$; use natural logarithms 25) _____

A) $\{\ln 5\}; x \approx 1.6094$

B) $\{ \}$

Determine if the given value of x is a solution to the logarithmic equation.

26) $\log_2(x - 63) = 6 - \log_2 x; x = 64$ 26) _____

A) Yes

B) No

Solve the equation. Write the solution set with the exact solutions. Also give approximate solutions to 4 decimal places if necessary.

27) $\log_5(6x - 14) = 1 + \log_5(x - 2)$ 27) _____

A) $\{-24\}$

B) $\{4\}$

C) $\left\{\frac{17}{5}\right\}$

D) $\left\{\frac{4}{11}\right\}$

28) $\ln x + \ln(x + 4) = \ln(2x + 35)$ 28) _____

A) $\{-5, 7\}$

B) $\{-7\}$

C) $\{5, -7\}$

D) $\{5\}$

Solve the problem.

29) In the formula $\text{pH} = -\log[\text{H}^+]$, the variable pH represents the level of acidity or 29) _____

alkalinity of a liquid on the pH scale, and H^+ is the concentration of hydronium ions in the solution. Determine the value of H^+ (in mol/L) for a liquid, given its pH value.

Round to 2 significant digits.

$\text{pH} = 10.1$

A) $7.9 \cdot 10^{-10}$ mol/L

B) $7.9 \cdot 10^{-11}$ mol/L

Answer Key

Testname: MAC1140_PRACTICE03

- 1) A
- 2) B
- 3) A
- 4) B
- 5) A
- 6) A
- 7) B
- 8) B
- 9) B
- 10) D
- 11) C
- 12) D
- 13) C
- 14) A
- 15) D
- 16) A
- 17) B
- 18) B
- 19) B
- 20) A
- 21) A
- 22) C
- 23) C
- 24) A
- 25) A
- 26) A
- 27) B
- 28) D
- 29) B