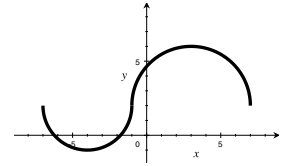


Name: \_\_\_\_\_

### 2-A Domain and Range

1. Fill in the blanks to state the domain and range of the graph at right.



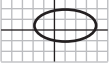
a) domain:  $\{x \mid \underline{\hspace{2cm}} \leq x \leq \underline{\hspace{2cm}}\}$       b) range:  $\{y \mid \underline{\hspace{2cm}} \leq y \leq \underline{\hspace{2cm}}\}$

2. Show that each of the following relations are not functions by choosing an  $x$ -value for each that would result in more than one  $y$ -value.

a)  $\{(4, 2), (2, 4), (4, 6), (5, 2), (6, 6)\}$  If  $x$  is \_\_\_\_\_,  $y$  could be \_\_\_\_\_ or \_\_\_\_\_.

b)  $y = \pm\sqrt{x} + 1$  If  $x$  is \_\_\_\_\_,  $y$  could be \_\_\_\_\_ or \_\_\_\_\_.

c)  $y = x$ 's brother If  $x$  is \_\_\_\_\_,  $y$  could be \_\_\_\_\_ or \_\_\_\_\_.

d)  If  $x$  is \_\_\_\_\_,  $y$  could be \_\_\_\_\_ or \_\_\_\_\_.

3. State the domain of the following functions.

a)  $a(x) = 4x^3 - 2x + 10$

b)  $b(x) = \{(1, 9), (2, 9), (3, 5)\}$

c)  $c(x) = \sqrt{2x + 8}$

d)  $d(x) = (x - 6)^{5/4}$

e)  $e(x) = (x - 6)^{8/3}$

f)  $f(x) = \log_5 x$

g)  $g(x) = \frac{4x - 3}{2x - 50}$

h)  $h(x) = \frac{4x - 3}{2x^2 - 50}$

i)  $i(x) = \log(x^2 - 25)$

### 2-B Composition and Inverses

4. Let  $a(x) = 2x + 1$  and  $b(x) = 3x^2 + 8x - 10$ . Give a value or expression for each of the following.

a)  $(a \circ b)(2)$

b)  $a(b(x))$

c)  $b(a(x))$

5.  $f(x) = 4x$  is the number of quarts in  $x$  gallons.

a) Give an equation for  $f^{-1}(x)$ .

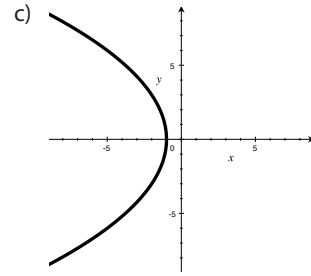
b) Calculate  $f(20)$  and explain what it means.

c) Calculate  $f^{-1}(20)$  and explain what it means.

6. Find the inverse of each of the following relations. Check the first two answers by finding  $a^{-1}(a(x))$  and  $b^{-1}(b(x))$ .

a)  $a(x) = 5x + 20$

b)  $b(x) = x^7$



## 2-C Power and Root Functions

7. Find all real 4<sup>th</sup> roots of the following numbers, if any.

a) 16

b) 20

c) -20

8. Evaluate by hand.

a)  $16^{3/2}$

b)  $1000^{5/3}$

c)  $4^{7/2}$

9. Find all real solutions, if any.

a)  $2x^4 = 40$

b)  $2(3x - 10)^3 + 40 = 8$

c)  $2(3x - 10)^4 + 40 = 8$

## 2-D Exponential Functions

10. For each of the following, identify the growth or decay rate  $r$  and the growth or decay factor  $b$ .

a) 5% increase

b) .021% decrease

c) 250% increase

d) no change

e) 3 times as much

d) 3 times more

11. The size of Leishman Lake is 10.4 square kilometers in 2019, and it is decreasing by 3.0% per year.

a) What will the area be in the year 2036?

b) What was the area in the year 2010?

12. Miles invests \$1800 in a bank account that earns 0.94% annual interest. Calculate the balance of the account in 10 years, given the stated frequency of compounding.

a) annual

b) daily

## 2-E Logarithmic Functions

13. Simplify.

a)  $\log_7 7^{5x}$

b)  $10^{\log 4x}$

c)  $\ln e^{8x+2}$

14. Rewrite in exponential form, and then identify the value of  $x$  if it exists.

a)  $x = \log_6 36$

b)  $x = \log_2 \frac{1}{8}$

c)  $x = \log_{12} 1$

d)  $x = \log_8 2$

e)  $x = \log_2 -8$

f)  $x = \log_2 8^m$

15. Circle each expression that requires a calculator to evaluate. Then evaluate each expression.

a)  $\log 1000$

b)  $\log 20$

c)  $\ln 9800$

d)  $\log_4 64$

e)  $\log_4 128$

f)  $\log_4 150$

16. Circle each equation that requires a calculator to solve. Then solve each equation.

a)  $9^x = 400$

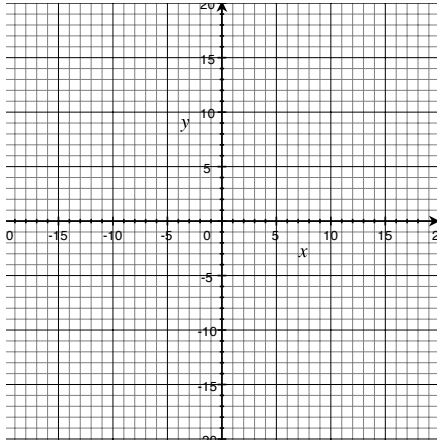
b)  $9^x = 400^{3x+12}$

c)  $9^x = 27^{3x+12}$

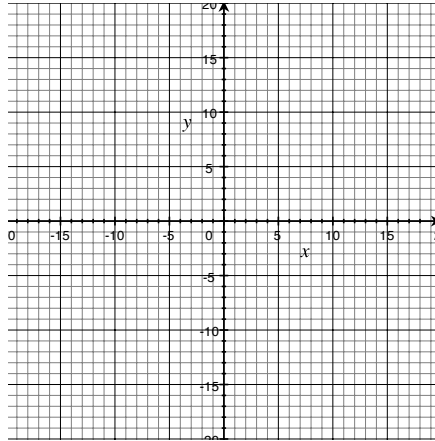
## 2-F Sketches of Functions

17. Sketch.

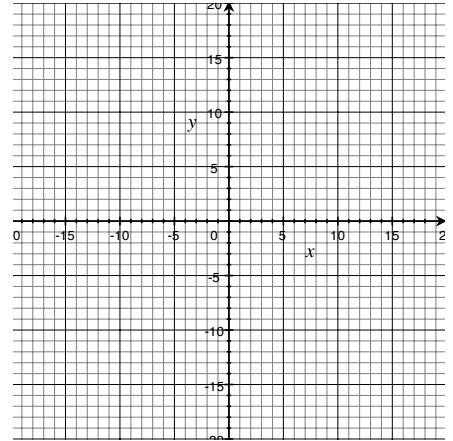
a)  $a(x) = x^{1/3}$



b)  $b(x) = \frac{1}{2}x$



c)  $c(x) = \log_3 x$



## 2-G Transformations

18. Write the equation the pre-image  $f(x) = 3x^2 + 5x + 1$  transformed as stated.

a) translated right 4 units and up 8 units

b) reflected across the y-axis

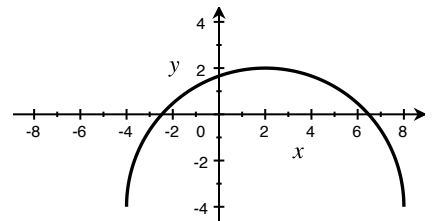
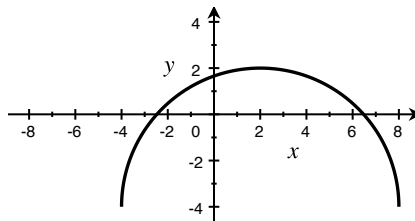
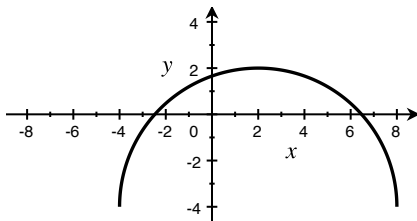
c) stretched horizontally by a factor of 2

19. Given the semicircle graph of  $d(x)$  shown, sketch the following.

a)  $d(x+2) + 1$

b)  $d(2x)$

c)  $\frac{1}{2}d(x)$



20. Write a simplified equation of the dotted graph given the provided equation for the solid graph.

a)  $a(x) = -2x^2 - 16x - 29$

b)  $b(x) = \sqrt{x+2} + 1$

c)  $c(x) = 2 \sin x$

