

Name \_\_\_\_\_ Date \_\_\_\_\_

## There Are Many Ways to Represent Functions

### Recognizing Algebraic and Graphical Representations of Functions

#### Vocabulary

Choose the term from the box that best completes each statement.

function notation	increasing function	exponential functions
function family	linear functions	linear absolute value functions
absolute maximum	quadratic functions	constant function
linear piecewise functions	decreasing function	absolute minimum

- \_\_\_\_\_ is a way to represent equations algebraically that makes it more efficient to recognize the independent and dependent variables.
- The family of \_\_\_\_\_ includes functions of the form  $f(x) = a \cdot b^x$ , where  $a$  and  $b$  are real numbers, and  $b$  is greater than 0 but is not equal to 1.
- The family of \_\_\_\_\_ includes functions that have an equation that changes for different parts, or pieces, of the domain.
- When both the independent and dependent variables of a function increase across the entire domain, the function is called an \_\_\_\_\_.
- A function has an \_\_\_\_\_ if there is a point on its graph that has a  $y$ -coordinate that is greater than the  $y$ -coordinates of every other point on the graph.
- A \_\_\_\_\_ is a group of functions that share certain characteristics.
- The family of \_\_\_\_\_ includes functions of the form  $f(x) = a|x + b| + c$ , where  $a$ ,  $b$ , and  $c$  are real numbers, and  $a$  is not equal to 0.
- When the dependent variable of a function decreases as the independent variable increases across the entire domain, the function is called a \_\_\_\_\_.
- The family of \_\_\_\_\_ includes functions of the form  $f(x) = ax^2 + bx + c$ , where  $a$ ,  $b$ , and  $c$  are real numbers, and  $a$  is not equal to 0.
- The family of \_\_\_\_\_ includes functions of the form  $f(x) = ax + b$ , where  $a$  and  $b$  are real numbers, and  $a$  is not equal to 0.
- If the dependent variable of a function does not change or remains constant over the entire domain, then the function is called a \_\_\_\_\_.
- A function has an \_\_\_\_\_ if there is a point on its graph that has a  $y$ -coordinate that is less than the  $y$ -coordinates of every other point on the graph.

## Problem Set

Rewrite each function using function notation.

1. Rewrite the function  $y = 3x - 8$  using function notation so that the dependent quantity, defined as  $f$ , is a function of the independent quantity  $x$ .

$$f(x) = 3x - 8$$

2. Rewrite the function  $y = 3x^2 + 6x - 1$  using function notation so that the dependent quantity, defined as  $C$ , is a function of the independent quantity  $x$ .

3. Rewrite the function  $y = 3^x + 8$  using function notation so that the dependent quantity, defined as  $P$ , is a function of the independent quantity  $x$ .

4. Rewrite the function  $l = |n - 2|$  using function notation so that the dependent quantity, defined as  $L$ , is a function of the independent quantity  $n$ .

5. Rewrite the function  $d = -\frac{1}{2}m + 5$  using function notation so that the dependent quantity, defined as  $A$ , is a function of the independent quantity  $m$ .

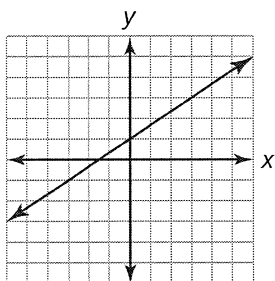
6. Rewrite the function  $c = 2\pi r^2$  using function notation so that the dependent quantity, defined as  $C$ , is a function of the independent quantity  $r$ .

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Choose the graph that represents each function. Use your graphing calculator.

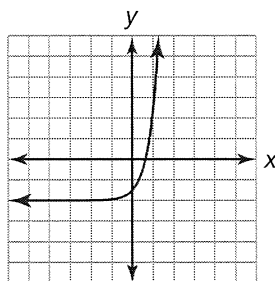
7.  $f(x) = \frac{2}{3}x + 2$

Graph A

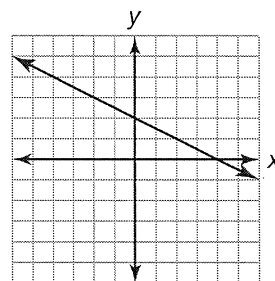


Graph A

Graph B

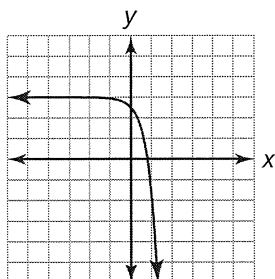


Graph C

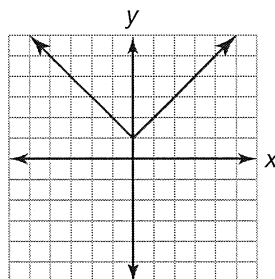


8.  $f(x) = -x^2 + 4$

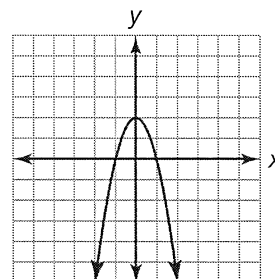
Graph A



Graph B

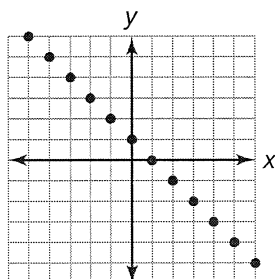


Graph C

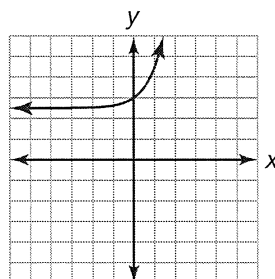


9.  $f(x) = 2^x + 5$

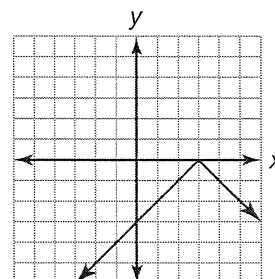
Graph A



Graph B

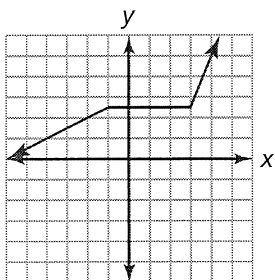


Graph C

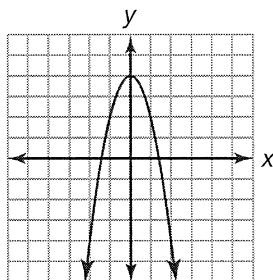


10.  $f(x) = |x - 6|$

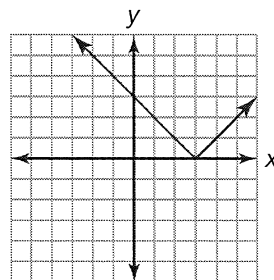
Graph A



Graph B

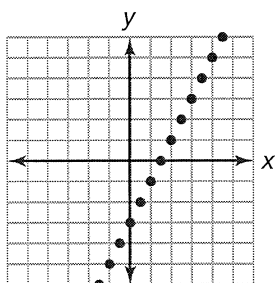


Graph C

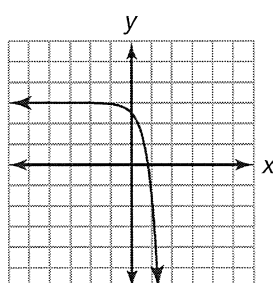


11.  $f(x) = 2x - 6$ , where  $x$  is an integer

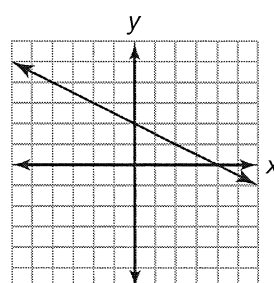
Graph A



Graph B

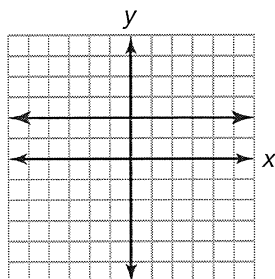


Graph C

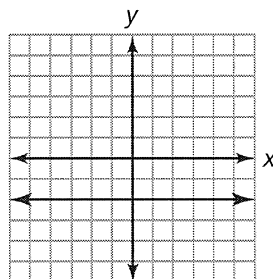


12.  $f(x) = -4$

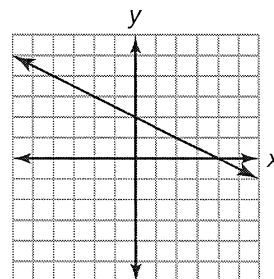
Graph A



Graph B



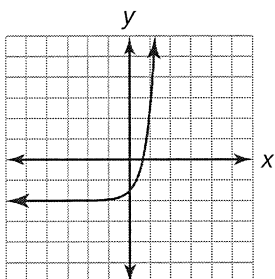
Graph C



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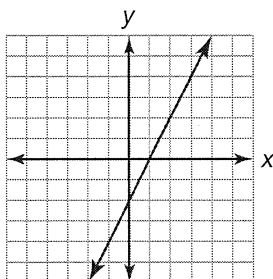
Determine whether each graph represents an increasing function, a decreasing function, a constant function, or a combination of increasing and decreasing functions.

13.

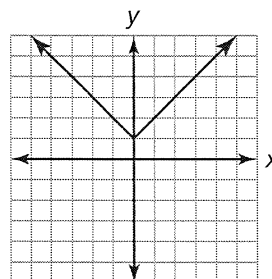


The graph represents an increasing function.

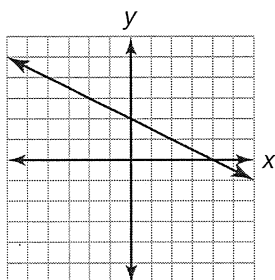
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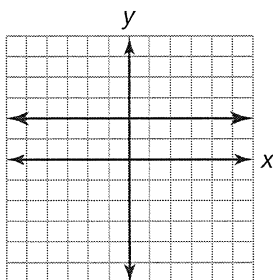
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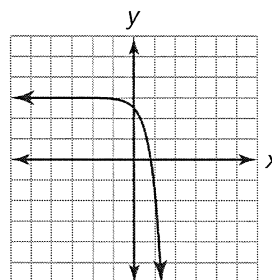
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17.

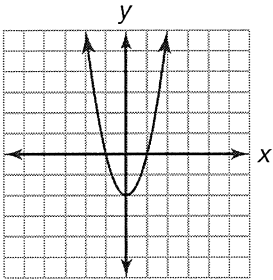


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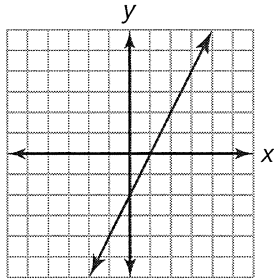
Determine whether each graph represents a function with an absolute minimum, an absolute maximum, or neither.

19.

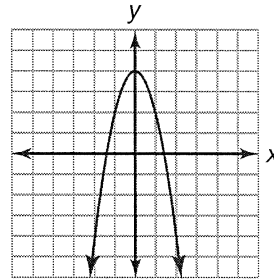


The graph represents a function with an absolute minimum.

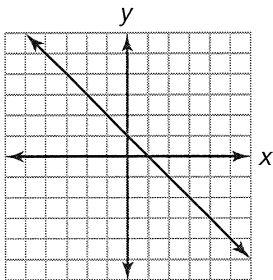
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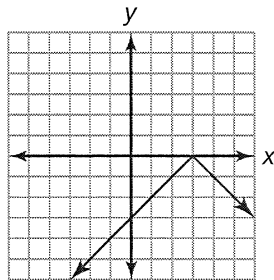
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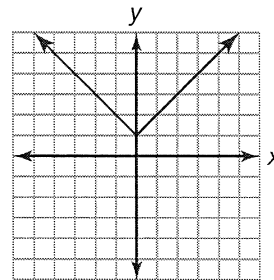
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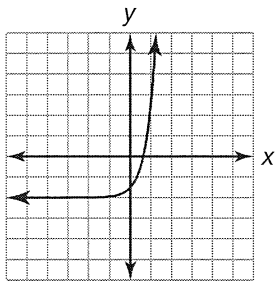
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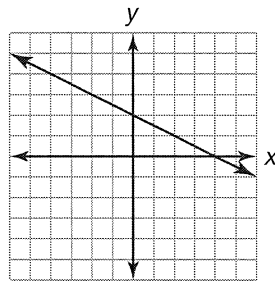
Determine whether each graph represents a linear function, a quadratic function, an exponential function, a linear absolute value function, a linear piecewise function, or a constant function.

25.

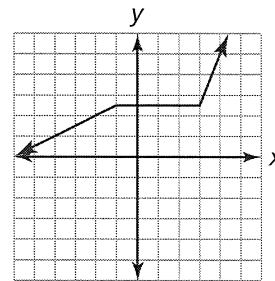


The graph represents an exponential function.

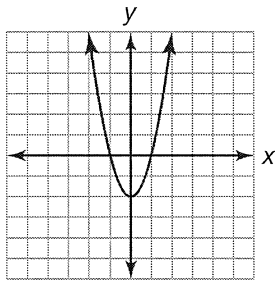
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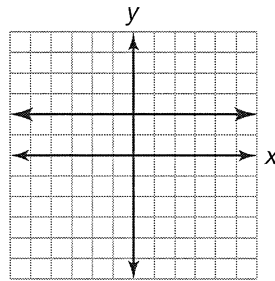
27.



28.



29.



30.

