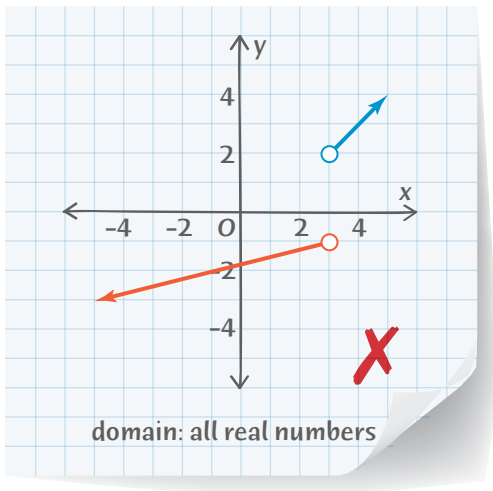


UNDERSTAND

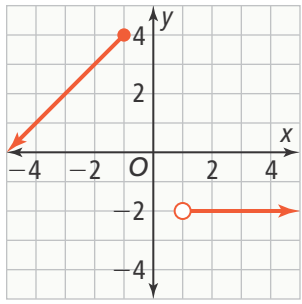
- 10. **Make Sense and Persevere** What do closed circles and open circles on the graph of a step function indicate?
- 11. **Error Analysis** What error did Damian make when defining the domain of the graph? Explain.



- 12. **Communicate Precisely** For what values of x is the function $f(x) = \begin{cases} -3x + 4, & -2 < x \leq 3 \\ 2x + 1, & 4 \leq x < 9 \end{cases}$ defined?
- 13. **Mathematical Connections** For the piecewise-defined function $f(x) = \begin{cases} 7, & x > 3 \\ 5x - 3, & x \leq 3 \end{cases}$ find two x -values that have the same y -value and the sum of the x -values is 10.
- 14. **Higher Order Thinking** The function $f(x) = \lfloor x \rfloor$ is called the greatest integer function because the output returned is the greatest integer less than or equal to x . For example, $f(3.2) = \lfloor 3.2 \rfloor = 3$ and $f(0.975) = \lfloor 0.975 \rfloor = 0$. Graph the function $f(x) = \lfloor x \rfloor$. What type of graph does this look like?

PRACTICE

- 15. A phone company offers a monthly cellular phone plan for \$25. The plan includes 250 anytime minutes, and charges \$0.20 per minute above 250 min. Write a piecewise-defined function for $C(x)$, the cost for using x minutes in a month. **SEE EXAMPLE 1**
 - 16. Graph the piecewise-defined function. State the domain and range. Identify whether the function is increasing, constant, or decreasing on each interval of the domain. **SEE EXAMPLE 2**
- $$f(x) = \begin{cases} \frac{1}{4}x + 3, & -2 < x \leq 0 \\ 2, & 0 < x \leq 4 \\ 3 - x, & 4 < x \leq 7 \end{cases}$$
- 17. Write the rule that defines the function in the following graph. **SEE EXAMPLE 3**



Write each absolute value function as a piecewise-defined function. **SEE EXAMPLE 4**

- 18. $f(x) = |3x + 1|$
- 19. $g(x) = |-2x - 6|$

Graph the step function. **SEE EXAMPLE 5**

$$f(x) = \begin{cases} 2, & -3 \leq x < 1 \\ 5, & 1 \leq x < 4 \\ 8, & 4 \leq x < 6 \\ 9, & 6 \leq x < 10 \end{cases}$$

- 21. The parking rates for a parking garage are shown. Graph the function for the cost of parking rates at the garage. **SEE EXAMPLE 5**

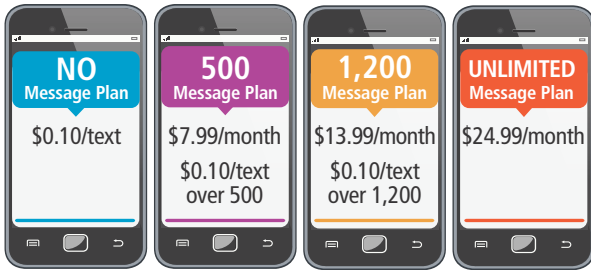
Parking Rates

\$4 per half hour

\$20 maximum for 12 hours

APPLY

- 22. Model With Mathematics** If Kyle works more than 40 h per week, his hourly wage for the extra hour(s) is 1.5 times the normal hourly wage of \$10 per hour. Write a piecewise-defined function that gives Kyle's weekly pay P in terms of the number h of hours he works. Determine how much Kyle will get paid if he works 45 h.
- 23. Look for Relationships** Text message plans offered at a phone company, along with overage charges, are shown.



- Write a function for each plan where x is the number of texts and $f(x)$ is the total monthly cost.
 - Sarah uses approximately 1,500 texts per month. What is the monthly cost under each text message plan?
 - Write an interval for the number of text messages that would make each plan the best one to purchase.
- 24. Reason** The cost C (in dollars) of sending next-day mail depends on the weight x (in ounces) of a package. The cost of packages, up to 5 lb, is given by the function below. What are the domain and range of the function?

$$f(x) = \begin{cases} 12.25, & 0 < x \leq 8 \\ 16.75, & 8 < x \leq 32 \\ 19.50, & 32 < x \leq 48 \\ 23.50, & 48 < x \leq 64 \\ 25.25, & 64 < x \leq 80 \end{cases}$$

ASSESSMENT PRACTICE

- 25.** Is 3 in the range of the function? Select **yes** or **no**.

	Yes	No
$f(x) = \begin{cases} x - 3, & x < -2 \\ 5 - x, & x > 1 \end{cases}$	<input type="radio"/>	<input type="radio"/>
$f(x) = \begin{cases} x - 3, & x < -2 \\ 5 - x, & x > 1 \end{cases}$	<input type="radio"/>	<input type="radio"/>
$f(x) = \begin{cases} x - 3, & x < -2 \\ 5 - x, & x > 1 \end{cases}$	<input type="radio"/>	<input type="radio"/>
$f(x) = \begin{cases} x - 3, & x < -2 \\ 5 - x, & x > 1 \end{cases}$	<input type="radio"/>	<input type="radio"/>

- 26. SAT/ACT** What is the vertex of the absolute value function $f(x) = -|x - a| + b$ where a and b are real numbers?
- (A) (a, b) (C) $(a, -b)$
 (B) $(-a, b)$ (D) $(-a, -b)$
- 27. Performance Task** Yama works a varying number of hours per month for a construction company. The following scatter plot shows how much money he earns for each number of hours he works. Write the piecewise-defined function that represents Yama's earnings as a function of his hours worked.

