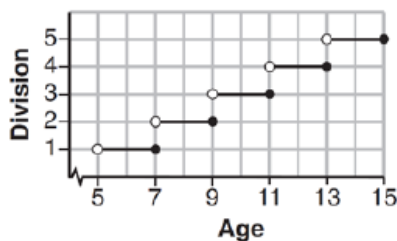


## STEP FUNCTIONS

A step function is typically a piecewise function with many sub functions that resemble stair steps.



Each step corresponds to a specific domain. The function rule for the graph above is:

$$f(x) = \begin{cases} 1, & 5 < x \leq 7 \\ 2, & 7 < x \leq 9 \\ 3, & 9 < x \leq 11 \\ 4, & 11 < x \leq 13 \\ 5, & 13 < x \leq 15 \end{cases}$$

## DEVELOPING ESSENTIAL SKILLS

Model each context with a step function.

1. You want to bring cupcakes to math club to celebrate your birthday. Each box of cupcakes contains 6 cupcakes and costs \$4.00. You expect as many as 30 students to be at math club. Create a function rule that models the cost in terms of the number of students in math club.

$$C(s) = \begin{cases} 4, & 0 < s \leq 6 \\ 8, & 7 < s \leq 12 \\ 12, & 13 < s \leq 18 \\ 16, & 19 < s \leq 24 \end{cases}$$

2. You're ordering pizza for your math teacher's birthday party. You estimate that each pizza will serve 4 people and that up to 26 people may attend. Create a function rule that models the number of pizzas you need to order in terms of the number of people attending.

$$P(s) = \begin{cases} 1, & 0 < s \leq 4 \\ 2, & 5 < s \leq 8 \\ 3, & 9 < s \leq 12 \\ 4, & 13 < s \leq 16 \\ 5, & 17 < s \leq 20 \\ 6, & 21 < s \leq 24 \\ 7, & 25 < s \leq 28 \end{cases}$$

## Answers

485) ANS: 1

Strategy: Focus on whether the line segments should begin and end with closed or open circles. A closed circle is included. An open circle is not included.

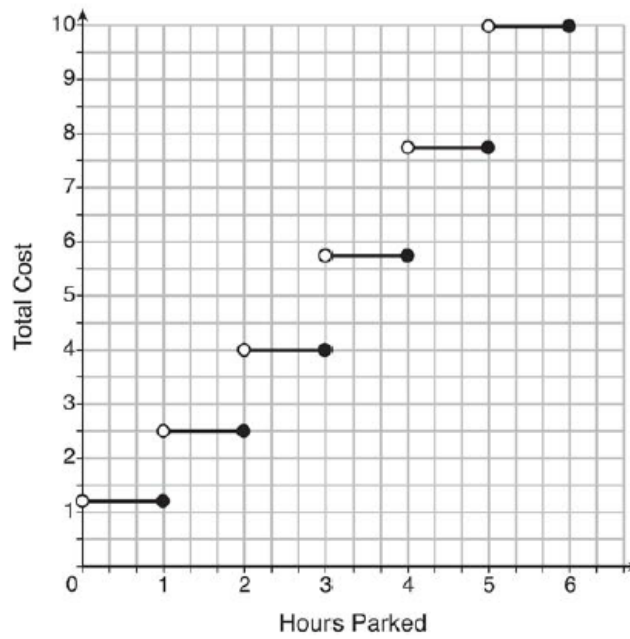
PTS: 2

NAT: F.IF.C.7

TOP: Graphing Step Functions

KEY: bimodalgraph

486) ANS:



The cost per hour to park gets bigger over the six hour period.

## Answers

Strategy: Graph this step function by hand using information from the table. This function has too many sections to easily input into a graphing calculator.

STEP 1. Graph the section for the domain  $0 < x \leq 1$ . The table shows that this interval corresponds to a cost of \$1.25 on the y-axis. Use an open dot at  $(0, 1.25)$  and a closed dot at  $(1, 1.25)$ . Connect the two dots with a solid line.

STEP 2. Graph the section for the domain  $1 < x \leq 2$ . The table shows that this interval corresponds to a cost of \$2.50 on the y-axis. Use an open dot at  $(1, 2.50)$  and a closed dot at  $(2, 2.50)$ . Connect the two dots with a solid line.

STEP 3. Graph the section for the domain  $2 < x \leq 3$ . The table shows that this interval corresponds to a cost of \$4.00 on the y-axis. Use an open dot at  $(2, 4.00)$  and a closed dot at  $(3, 4.00)$ . Connect the two dots with a solid line.

STEP 4. Graph the section for the domain  $3 < x \leq 4$ . The table shows that this interval corresponds to a cost of \$5.75 on the y-axis. Use an open dot at  $(3, 4.75)$  and a closed dot at  $(4, 4.75)$ . Connect the two dots with a solid line.

STEP 5. Graph the section for the domain  $4 < x \leq 5$ . The table shows that this interval corresponds to a cost of \$7.75 on the y-axis. Use an open dot at  $(4, 7.75)$  and a closed dot at  $(5, 7.75)$ . Connect the two dots with a solid line.

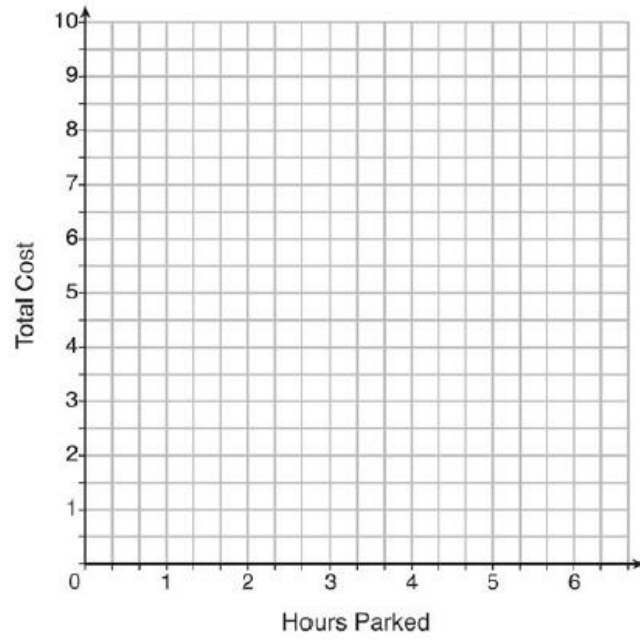
STEP 6. Graph the section for the domain  $5 < x \leq 6$ . The table shows that this interval corresponds to a cost of \$10.00 on the y-axis. Use an open dot at  $(5, 10.00)$  and a closed dot at  $(6, 10.00)$ . Connect the two dots with a solid line.

STEP 7: Answer the question based on the graph and the table.

PTS: 4

NAT: F.IF.C.7

TOP: Graphing Step Functions



Explain how the cost per hour to park changes over the six-hour period.