

Section 3 – Topic 5
Real-World Examples of Piecewise-Defined Functions

Let's Practice!

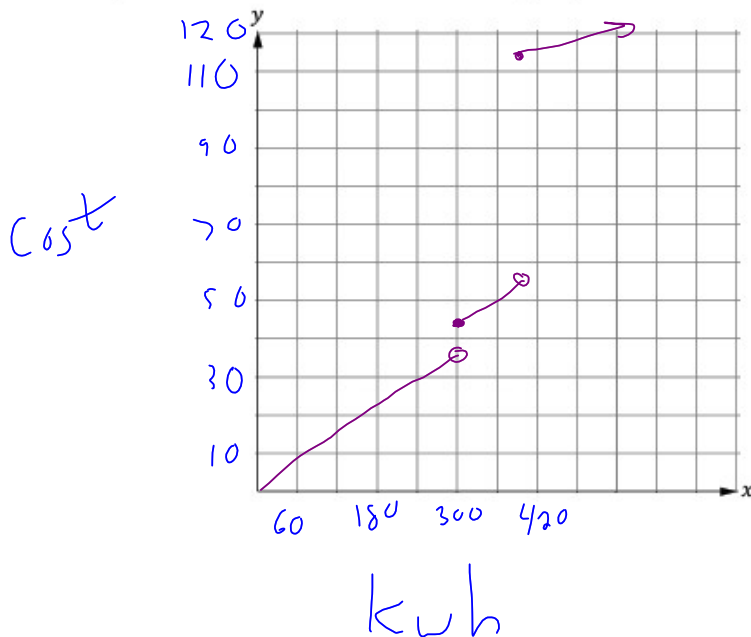
- TECO, an electric company, charges its customers based on the amount of wattage used, measured in kilowatt-hour (kWh). The price customers pay fluctuates depending on wattage consumption. The following prices apply per kWh:

12 cents/kWh up to but not including 300 kWh
 14 cents/kWh for 300 kWh up to but not including 390 kWh
 29 cents/kWh for 390 kWh or more

Write the piecewise-defined function that represents the situation.

$$f(x) = \begin{cases} .12x & x < 300 \\ .14x & 300 \leq x < 390 \\ .29x & x \geq 390 \end{cases}$$

Represent the function on the graph below.



$$\begin{aligned} .12(300) &= 36 \\ .12(299) &= 35.88 \\ .14(300) &= 42 \\ .14(390) &= 54.6 \\ .29(390) &= 113.10 \end{aligned}$$

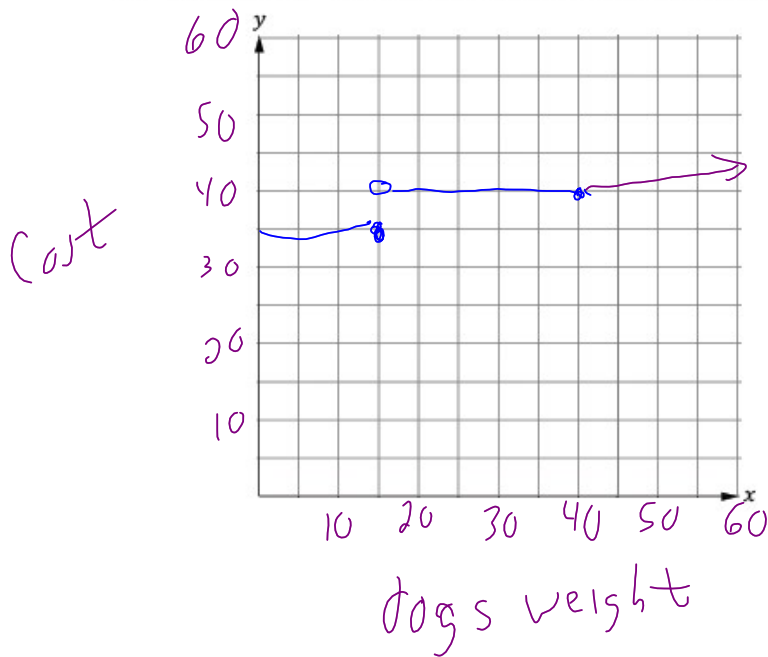
Try It!

2. The dog grooming service in Pet Care charges according to the dog's weight. For dogs weighing 15 pounds or less, the grooming fee is \$35.00. For dogs weighing more than 15 pounds and up to 40 pounds, the fee is \$40.00. For dogs weighing over 40 pounds, the fee is \$40.00, plus \$0.25 for each additional pound over 40.

- a. Write the piecewise-defined function that represents the situation.

- b. Represent the function on the graph below.

$$f(x) \begin{cases} 35 & x \leq 15 \\ 40 & 15 < x \leq 40 \\ 40 + 0.25x & x > 40 \end{cases}$$



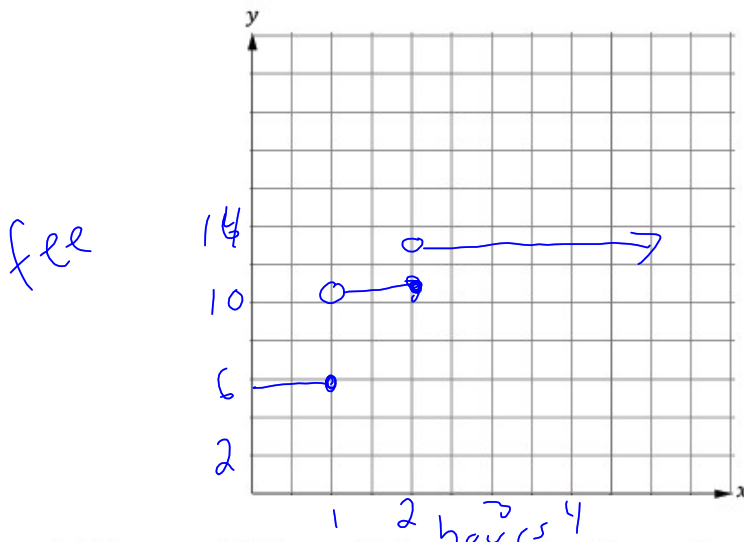
Let's Practice!

3. During the week, a local parking garage charges flat rate parking fees based upon lengths of time. For vehicles parked up to one hour, inclusive, the charge is \$6.00. For vehicles parked more than one hour and up to 2 hours, inclusive, the charge is \$10.50. For vehicles parked more than 2 hours, the charge is \$13.00

a. Write the piecewise-defined function that represents the situation.

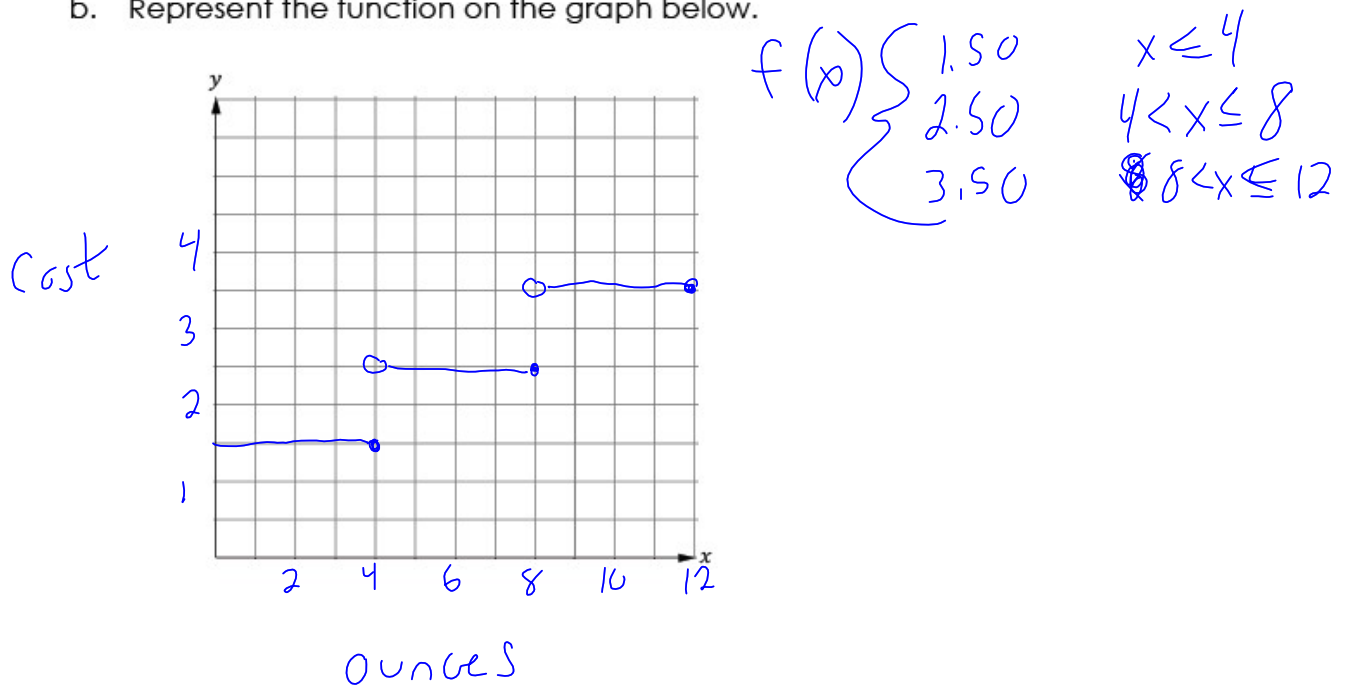
b. Represent the function on the graph below.

$$f(x) = \begin{cases} 6 & x \leq 1 \\ 10.50 & 1 < x \leq 2 \\ 13 & x > 2 \end{cases}$$



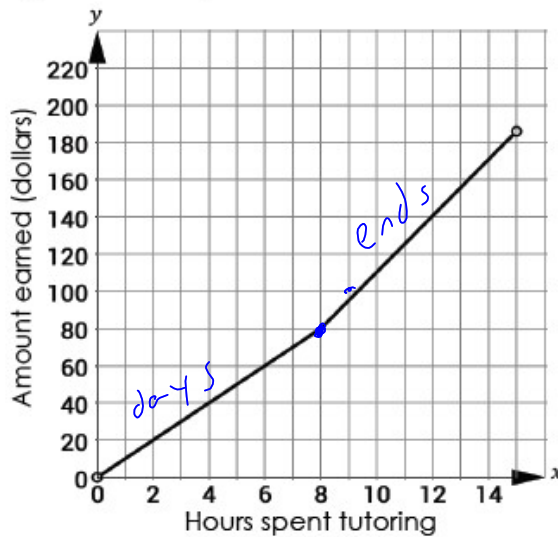
This is a special type of piecewise function called a **step function**.

4. The post office offers flat-rate mailing based on the weight of the package. The charge is \$1.50 for packages weighing up to four ounces, inclusive. For packages weighing more than four ounces and up to eight ounces, inclusive, the charge is \$2.50. For packages weighing more than eight ounces and up to twelve ounces, inclusive, the charge is \$3.50.
- Write the piecewise-defined function that represents the situation.
 - Represent the function on the graph below.



BEAT THE TEST!

1. Kiara tutors students to earn spending money. She charges an hourly rate to tutor on weekdays after school and a higher hourly rate to tutor on weekends. The following graph represents Kiara's earnings in one week beginning on Monday.



Which of the following statements are true? Select all that apply,

- Kiara tutors eight hours on weekdays after school.
- Kiara charges \$20 per hour to tutor on the weekends.
- Kiara tutors 15 hours over the weekend.
- Kiara earned \$80 tutoring on weekdays after school.
- Kiara earned \$185 tutoring on the weekend.

