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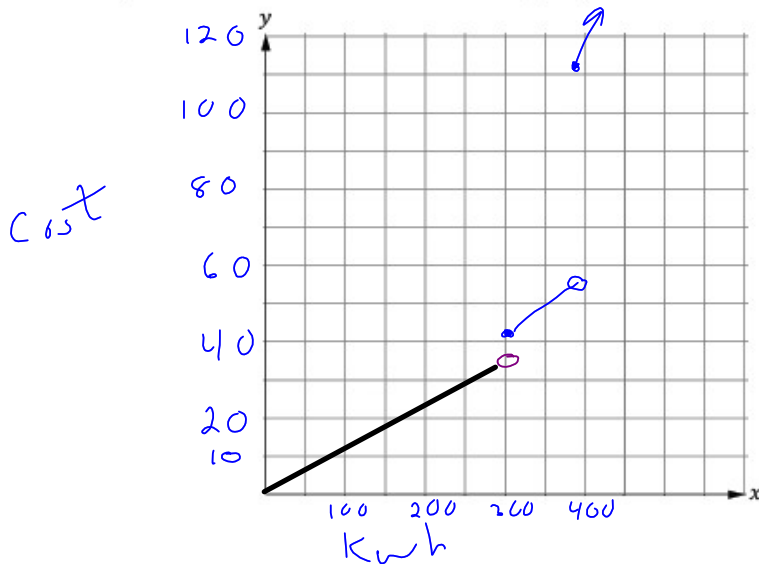## Real-World Examples of Piecewise-Defined Functions

Let's Practice!

1. 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.

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

Represent the function on the graph below.

$.12(300) = 36$
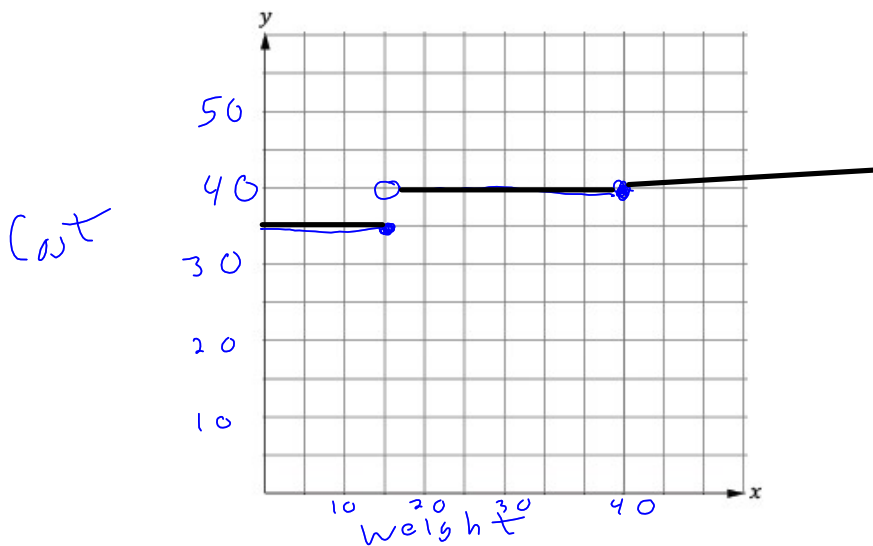$.14(300) = 42$
$.14(390) = 54.6$
$.29(390) = 113.10$

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.

   $$f(x) = \begin{cases} 35 & x \le 15 \\ 40 & 15 < x \le 40 \\ 40 + .25x & 40 < x \end{cases}$$

   b. Represent the function on the graph below.
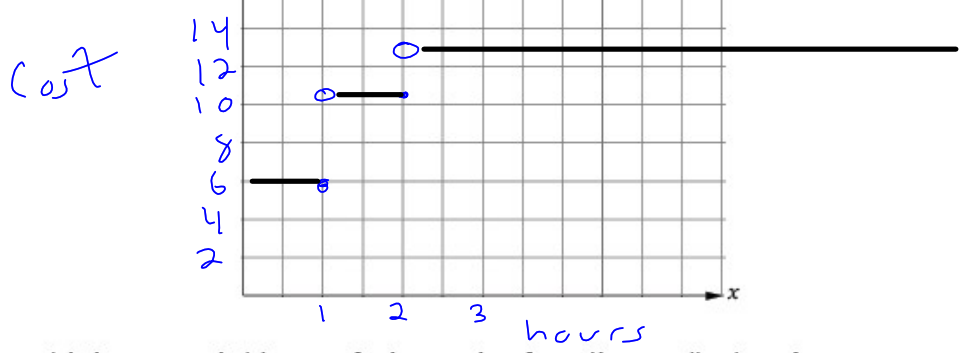

Cost

weight

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.
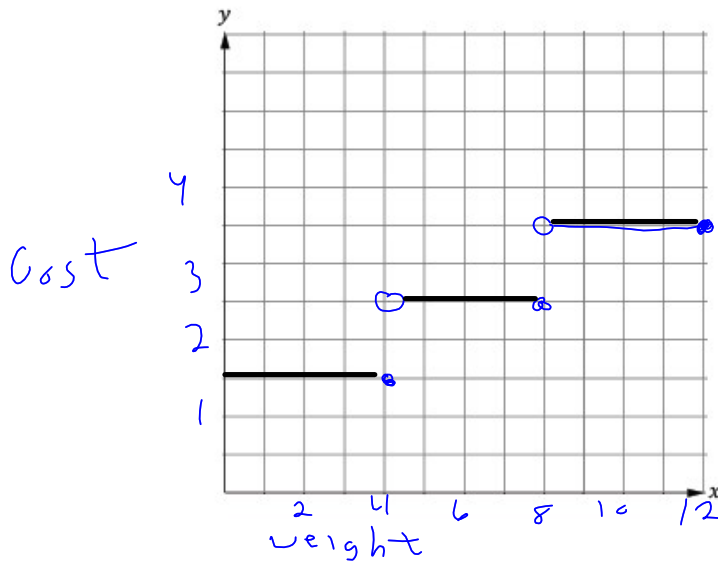
   b. Represent the function on the graph below.

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

Cost

hours

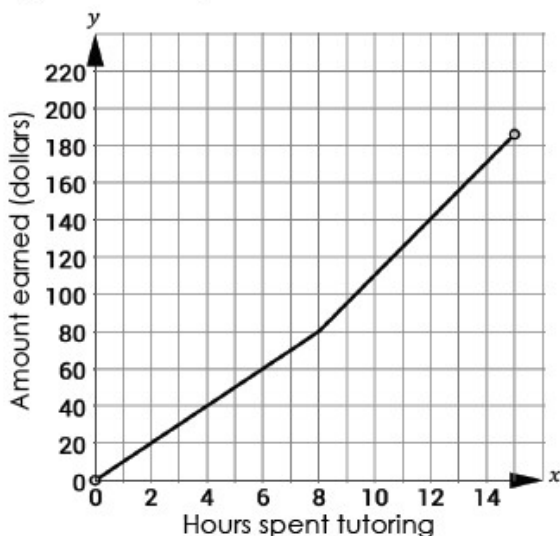This is a special type of piecewise function called a **step function.**

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.

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

b. Represent the function on the graph below.

$$F(x) \begin{cases} 1.50 & x \le 4 \\ 2.50 & 4 < x \le 8 \\ 3.50 & 8 < x \le 12 \end{cases}$$

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.