TAKS EXAMPLE 4 TAKS REASONING: Multi-Step Problem

EVENT PLANNING You are helping to plan an awards banquet for your school, and you need to rent tables to seat 180 people. Tables come in two sizes. Small tables seat 4 people, and large tables seat 6 people. This situation can be modeled by the equation

$$4x + 6y = 180$$

where x is the number of small tables and y is the number of large tables.

- Find the intercepts of the graph of the equation.
- Graph the equation.
- Give four possibilities for the number of each size table you could rent.

Solution

STEP 1 **Find** the intercepts.

$$4x + 6y = 180$$
$$4x + 6(0) = 180$$
$$x = 45 \leftarrow \textit{x}\text{-intercept}$$

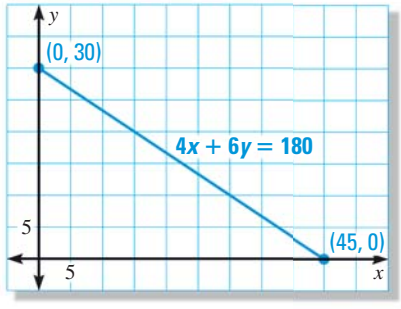
$$4x + 6y = 180$$
$$4(0) + 6y = 180$$
$$y = 30 \leftarrow \textit{y}\text{-intercept}$$

DRAW A GRAPH
Although x and y represent whole numbers, it is convenient to draw an unbroken line segment that includes points whose coordinates are not whole numbers.

STEP 2 **Graph** the equation.

The x-intercept is 45, so plot the point (45, 0). The y-intercept is 30, so plot the point (0, 30).

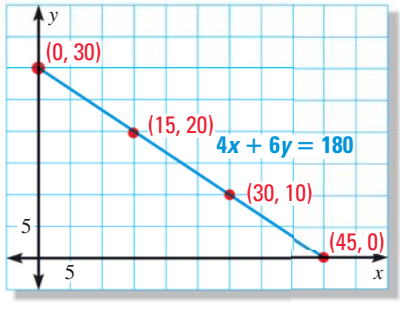
Since x and y both represent numbers of tables, neither x nor y can be negative. So, instead of drawing a line, draw the part of the line that is in Quadrant I.



FIND SOLUTIONS
Other points, such as (12, 22), are also on the graph but are not as obvious as the points shown here because their coordinates are not multiples of 5.

STEP 3 **Find** the number of tables. For this problem, only whole-number values of x and y make sense. You can see that the line passes through the points **(0, 30)**, **(15, 20)**, **(30, 10)**, and **(45, 0)**.

So, four possible combinations of tables that will seat 180 people are: 0 small and 30 large, 15 small and 20 large, 30 small and 10 large, and 45 small and 0 large.



GUIDED PRACTICE for Example 4

6. WHAT IF? In Example 4, suppose the small tables cost \$9 to rent and the large tables cost \$14. Of the four possible combinations of tables given in the example, which rental is the least expensive? *Explain*.