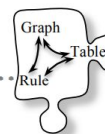


### 3.1.7 What is wrong with this graph?

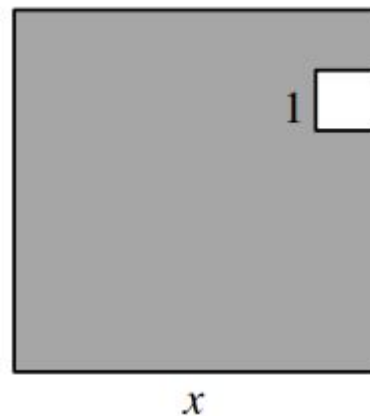
Identifying Common Graphing Errors



In this chapter you have used rules to find  $y$ -values to go with  $x$ -values in tables. Then you graphed the  $x \rightarrow y$  pairs you found. Today you will be examining how rules, tables, and graphs can be used to represent new situations. You will also learn how to avoid common graphing errors. As you work, revisit the questions below.

**What  $x$ -values should go in my table? How can I correct this error? How should I scale my graph?**

**3-61.** Ms. Cai's class is studying the "dented square" shape shown at right. This shape is formed by removing a square with side length 1 from a larger square. Her students decided to let  $x$  represent the side length of the large square and  $y$  represent the perimeter of the entire shape.



a. What is the perimeter of the "dented square?" That is, what rule could help you find the perimeter for any value of  $x$ ?

b. Make a table for the rule you found. Make sure the  $x$ -values you use are appropriate for this situation. What are the possible  $x$ -values?

c. In this situation,  $x$  has a lower boundary value. This means that it must be greater than a specific value for the situation to make sense. Using what you know about writing inequalities, write an inequality statement for this limitation.

d. If you were to graph the inequality in part (c) on a number line, it would have an open circle. Why? How do you think this could be shown on a coordinate graph for this situation? Discuss this with your team and share your ideas with your class.

e. Do you think the points on your graph should be connected? Justify your answer.

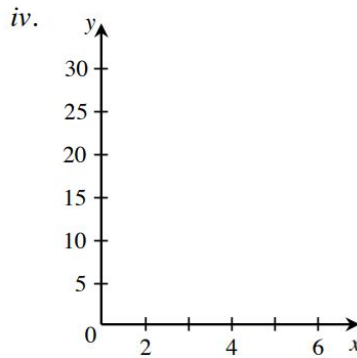
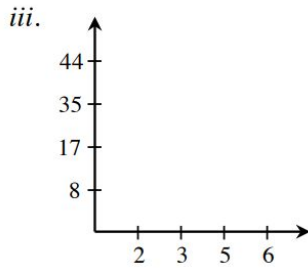
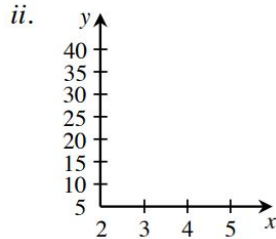
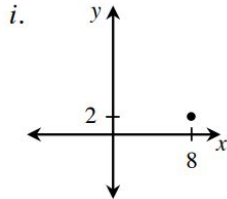
f. Using what you decided in parts (d) and (e), make a graph from your  $x \rightarrow y$  table.

**3-62. GOOFY GRAPHING** Now Ms. Cai's class is studying a tile pattern. Her students decided to represent the pattern with the  $x \rightarrow y$  table at right.

$x$	$y$
2	8
3	17
5	35
6	44

a. Ms. Cai wants her class to graph the data in this table. Write  $(x, y)$  coordinates for each point that needs to be plotted.

b. When Ms. Cai's students started to graph this data, they made mistakes right from the beginning. The diagrams below show how some of Ms. Cai's students set up their axes.



**Your Task:** Find all of the mistakes the students made in setting up the graphs. (There may be more than one mistake in each graph!) Explain why this is an incorrect way to set up a graph, or why this is not the best way to set up the graph for this problem. **Be ready to present your team's ideas to the class.**

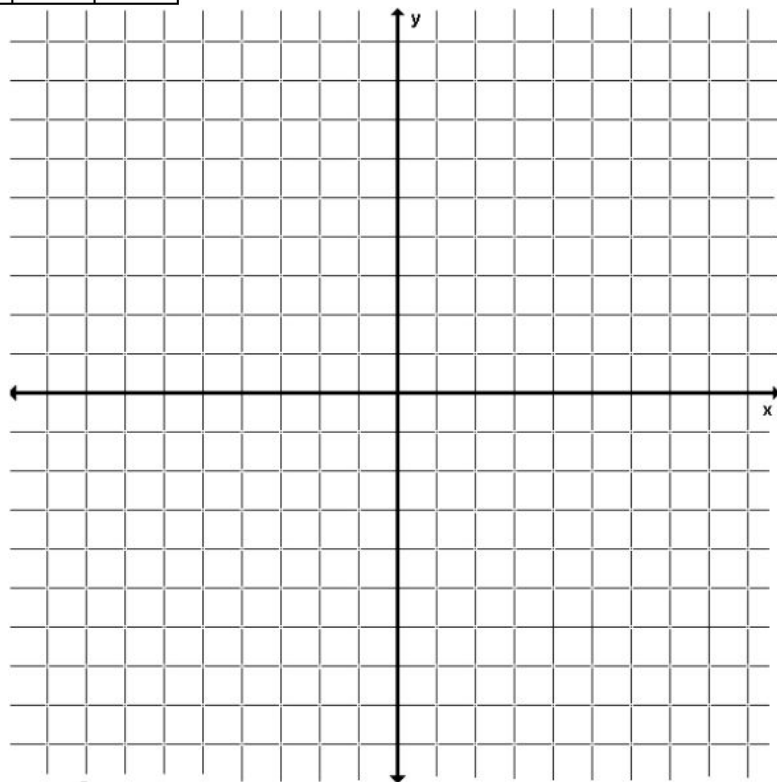
GRAPH <i>i</i>	
GRAPH <i>ii</i>	
GRAPH <i>iii</i>	
GRAPH <i>iv</i>	

**3-65. ONE OF THESE POINTS IS NOT LIKE THE OTHERS, Part Two**

a. Plot and connect the points listed in the table below.

IN ( $x$ )	-2	4	1	-4	0	3	-3	2
OUT ( $y$ )	0	12	-3	12	-4	5	-2	0

b. Identify the point that does not fit the pattern.



c. What shape does the graph appear to make?

d. Correct the point identified in part (b) so it fits the pattern. Write the points in  $(x, y)$  notation.

**3-66.** For each rule below, make a table of  $x$ - and  $y$ -values and then graph the rule on graph paper. Label each graph with its equation.

a.  $y = x^2$

b.  $y = -x^2$

c. Compare the graphs. What do you notice?

d. For the graph of  $y = x^2$ , estimate the  $x$ -values corresponding to  $y = 5$ .

e. For the graph of  $y = -x^2$ , estimate the  $x$ -values corresponding to  $y = -10$ .