

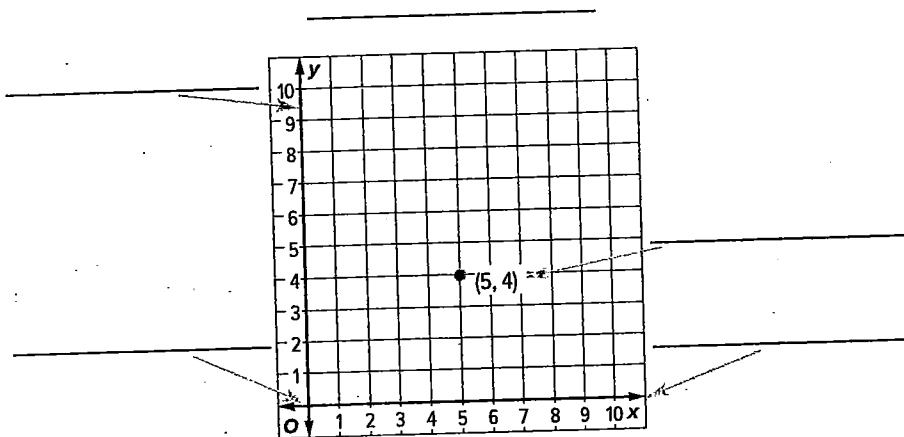
Graph Ratio Tables

Vocabulary Start-Up



The **coordinate plane** is formed when two perpendicular number lines intersect at their zero points. This point is called the **origin**. The horizontal number line is called the **x-axis** and the vertical number line is called the **y-axis**. An **ordered pair**, such as (2, 3), is a pair of numbers used to locate a point on the coordinate plane.

Fill in the blanks with the highlighted words from above.



Essential Question

HOW do you use equivalent rates in the real world?



Vocabulary

- coordinate plane
- origin
- x-axis
- y-axis
- ordered pair
- x-coordinate
- y-coordinate
- graph



Common Core State Standards

Content Standards
6.RP.3, 6.RP.3a



Mathematical Practices
1, 3, 4



Real-World Link

In 3 minutes, a North American wood turtle can travel about 17 yards. If the **x-axis** represents minutes and the **y-axis** represents yards, write an ordered pair to represent this situation.

(,)
minutes yards

Which **MP** Mathematical Practices did you use?

Shade the circle(s) that applies.

- | | |
|--|---|
| <input type="checkbox"/> 1 Persevere with Problems | <input type="checkbox"/> 5 Use Math Tools |
| <input type="checkbox"/> 2 Reason Abstractly | <input type="checkbox"/> 6 Attend to Precision |
| <input type="checkbox"/> 3 Construct an Argument | <input type="checkbox"/> 7 Make Use of Structure |
| <input type="checkbox"/> 4 Model with Mathematics | <input type="checkbox"/> 8 Use Repeated Reasoning |

FINISH



Graph Ordered Pairs

You can use an ordered pair to name any point on the coordinate plane. The first number in an ordered pair is the **x-coordinate**, and the second number is the **y-coordinate**.

The x-coordinate corresponds to a number on the x-axis.

(3, 6)

The y-coordinate corresponds to a number on the y-axis.

You can express information in a table as a set of ordered pairs. To see patterns, **graph** the ordered pairs on the coordinate plane.



Examples

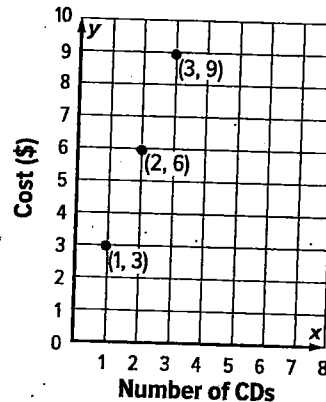
Tutor

The table shows the cost in dollars to create CDs of digital photos at a photo shop. The table also shows this information as ordered pairs (number of CDs, cost in dollars).

Number of CDs, x	Cost in Dollars, y	Ordered Pair (x, y)
1	3	(1, 3)
2	6	(2, 6)
3	9	(3, 9)

1. Graph the ordered pairs.

Start at the origin. Use the x-coordinate and move along the x-axis. Then use the y-coordinate and move along the y-axis. Draw a dot at each point.



2. Describe the pattern in the graph.

The points appear in a line. Each point is one unit to the right and three units up from the previous point.

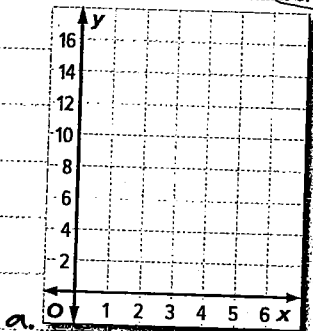
So, the cost increases by \$3 for every CD created.

Got it? Do these problems to find out.

The table shows Gloria's earnings for 1, 2, and 3 hours. The table also lists this information as ordered pairs (hours, earnings).

Hours, x	Dollars Earned, y	Ordered Pair (x, y)
1	5	(1, 5)
2	10	(2, 10)
3	15	(3, 15)

- Graph the ordered pairs.
- Describe the pattern in the graph.



a.

b.

Show your work.

Compare Ratios

You can use tables and graphs to compare ratios. The greater the ratio, the steeper the line will appear.



Examples



Two friends are making scrapbooks. Renée places 4 photos on each page of her scrapbook. Gina places 6 photos on each page of her scrapbook.

- Make a table for each scrapbook that shows the total number of photos placed, if each book has 1, 2, 3, or 4 pages. List the information as ordered pairs (pages, photos).

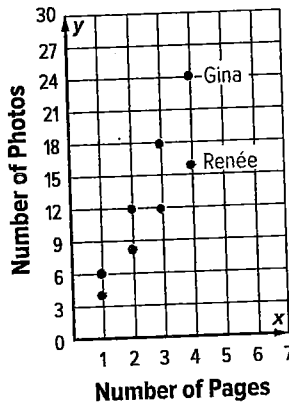
Pages, x	Photos, y	(x, y)
1	4	(1, 4)
2	8	(2, 8)
3	12	(3, 12)
4	16	(4, 16)

Pages, x	Photos, y	(x, y)
1	6	(1, 6)
2	12	(2, 12)
3	18	(3, 18)
4	24	(4, 24)

- Graph the ordered pairs for each friend on the same coordinate plane.

Graph the ordered pairs for Renée's scrapbook in blue.

Graph the ordered pairs for Gina's scrapbook in red.



- How does the ratio of photos to each page compare for each person? How is this shown on the graph?

The ratio of photos to pages for Renée's scrapbook is 4:1 while the ratio for Gina's scrapbook is 6:1. On the graph, both sets of points appear to be in a straight line, but the line for Gina is steeper than the line for Renée.

STOP and Reflect

Marta is also making a scrapbook. She places 5 photos on each page. How does the ratio of photos to each page compare for her book, Gina's book, and Renée's book?

Guided Practice



Two friends are each saving money in their bank accounts. Marcus saves \$10 each week while David saves \$15 each week. (Examples 1–5)

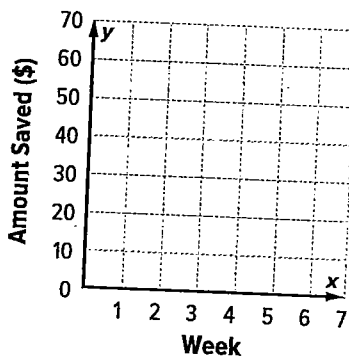
1. Make a table for each friend that shows the total amount saved for 1, 2, 3, and 4 weeks. List the information as ordered pairs (weeks, total dollars saved).

Show your work.

Marcus		
Weeks, x	Total Saved (\$), y	(x, y)
1		
2		
3		
4		

David		
Weeks, x	Total Saved (\$), y	(x, y)
1		
2		
3		
4		

2. Graph the ordered pairs for each friend on the same coordinate plane.



3. How do the ratios of Marcus's savings and David's savings compare? How is this shown on the graph?

4. **Building on the Essential Question** How can graphing help solve a problem involving ratios?

Rate Yourself!

How confident are you about graphing ratios? Check the box that applies.

For more help, go online to access a Personal Tutor.

Tutor

FOLDABLES Time to update your Foldable!



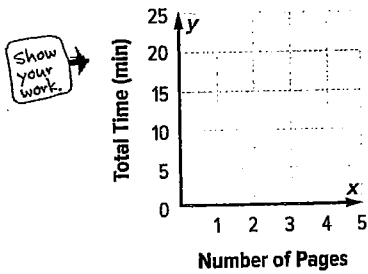
Go online for Step-by-Step Solutions

Independent Practice

The table shows the total time it took Samir to read 0, 1, 2, and 3 pages of the book. The table also lists this information as ordered pairs (number of pages, total minutes). (Examples 1–2)

Number of Pages, x	Total Minutes, y	Ordered Pair (x, y)
0	0	(0, 0)
1	4	(1, 4)
2	8	(2, 8)
3	12	(3, 12)

1 Graph the ordered pairs.



2. Describe the pattern in the graph.

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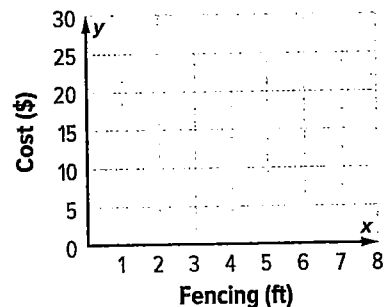
Ken's Home Supply charges \$5 for each foot of fencing. Wayne's Warehouse charges \$6 for each foot of fencing. (Examples 3–5)

3. Make a table for each store that shows the total cost for 1, 2, 3, or 4 feet of fencing. List the information as ordered pairs (feet of fencing, total cost).

Fencing (ft), x	Cost (\$), y	(x, y)
1		
2		
3		
4		

Fencing (ft), x	Cost (\$), y	(x, y)
1		
2		
3		
4		

4. Graph the ordered pairs for each store on the same coordinate plane.



5 Using the tables and graphs, write a few sentences comparing the ratios of amount charged per foot of fencing for each store. How is this shown on the graph?

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6. **MP Justify Conclusions** Patty's Pies made 2 peach pies using 10 cups of peaches. They made 3 pies using 15 cups of peaches and 4 pies using 20 cups of peaches. Predict how many cups of peaches would be needed to make 9 peach pies. Explain.

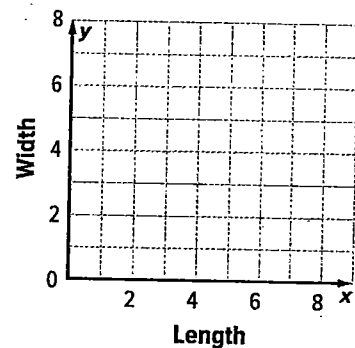
7. **MP Multiple Representations** The *golden rectangle* is a rectangle in which the ratio of the length to the width is approximately 1.618 to 1. This ratio is called the *golden ratio*.

Length, x	Width, y	(x, y)

- a. **Table** Make a ratio table to show the approximate lengths of golden rectangles given widths that are 1, 2, 3, and 4 units. List the information as ordered pairs (length, width).

- b. **Graph** Graph the ordered pairs on the coordinate plane.

- c. **Analyze** How does the area of each rectangle change as the dimensions change?

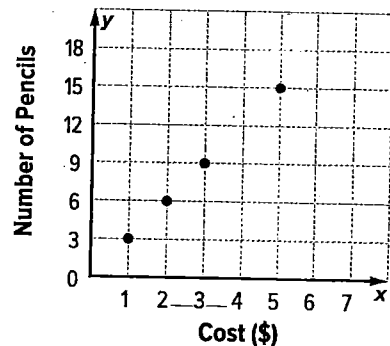


H.O.T. Problems Higher Order Thinking

8. **MP Model with Mathematics** Write a real-world problem using ratios or rates that could be represented on the coordinate plane.

9. **MP Persevere with Problems** Give the coordinates of the point located halfway between (2, 1) and (2, 4).

10. **MP Persevere with Problems** The graph shows the cost of purchasing pencils from the school office. The graph is missing a point to indicate the cost of 12 pencils. Complete the graph by plotting the missing information. Explain your answer.

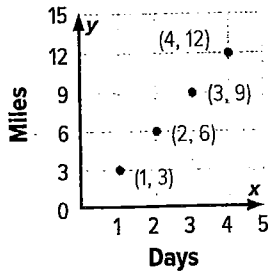


Extra Practice

The table shows the total number of miles Ariel runs for several days. The table also lists this information as ordered pairs (number of days, total miles).

11. Graph the ordered pairs.

Ariel's Running Record		
Days, x	Miles, y	(x, y)
1	3	(1, 3)
2	6	(2, 6)
3	9	(3, 9)
4	12	(4, 12)



12. Describe the pattern in the graph. The graph shows that as the number of days increases by 1, the number of miles run increases by 3.

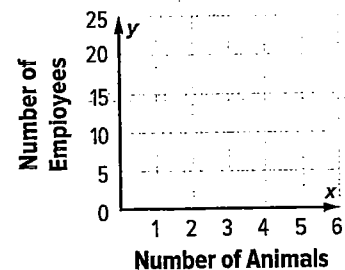
There are two employees for every tiger in the tiger exhibit at a local zoo. For every elephant in the elephant exhibit, there are four employees.

13. Make a table for each animal that shows the total number of employees for 1, 2, 3, or 4 animals. List the information as ordered pairs (number of animals, number of employees).

Tiger Exhibit			Elephant Exhibit		
Animals, x	Employees, y	(x, y)	Animals, x	Employees, y	(x, y)
1			1		
2			2		
3			3		
4			4		

14. Graph the ordered pairs for each exhibit on the same coordinate plane.

15. **MP Justify Conclusions** Using the tables and graphs, write a few sentences comparing the ratios of the number of employees per animal. How is this shown on the graph?



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Power Up! Common Core Test Practice

16. The table gives the ratio of teachers to students at Jefferson Middle School.

At Hamilton Middle School, the ratio of teachers to students is 12 to 312. Which statement correctly compares the ratio of the teachers to students at the two schools?

Jefferson Middle School	
Students	Teachers
24	1
48	2
72	3
96	4

- There are more students per teacher at Hamilton Middle School than at Jefferson Middle School.
- Both schools have an equivalent ratio of students to teachers.
- There are more students at Hamilton Middle School than at Jefferson Middle School.
- There are more students per teacher at Jefferson Middle School than at Hamilton Middle School.

17. Nina earns \$15 for each yard she mows. She wants to buy a dress that costs \$109. How many yards will she need to mow to earn the money for the dress? Explain.



Common Core Spiral Review

Simplify each fraction. 5.NF.5b

18. $\frac{13}{78} = \frac{\square}{\square}$

19. $\frac{26}{130} = \frac{\square}{\square}$

20. $\frac{20}{240} = \frac{\square}{\square}$

21. There are 270 sixth grade students and 45 chaperones going on a field trip. How many students will be with each chaperone if the groups are divided equally? 5.NBT.5 _____

22. Several students were surveyed about their favorite class. The results are shown in the table. What fraction of the students chose music as their favorite subject? Write the fraction in simplest form. 5.NF.3

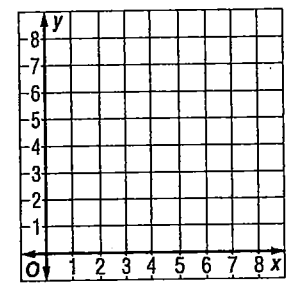
Favorite Class	
Art	26
English	19
Math	21
Music	16
Science	32

Lesson 5 Homework Practice

Graph Ratio Tables

Graph and label each point on the coordinate plane at the right.

- 1. $N(8, 6)$
- 2. $P(0, 8)$
- 3. $R(4, 8)$
- 4. $S(3, 4)$
- 5. $T(6, 8)$
- 6. $W(6, 2)$
- 7. $A(8, 2)$
- 8. $B(2, 7)$

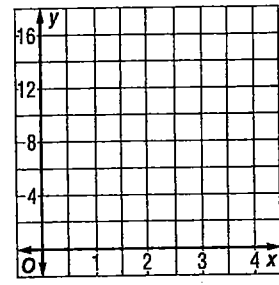


9. **CAR WASH** Use the following information.

A car wash can wash four cars in one hour. The table shows the total number of cars washed in 0, 1, 2, and 3 hours.

Hours	0	1	2	3
Cars Washed	0	4	8	12

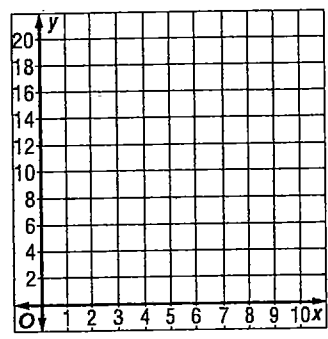
- a. List this information as ordered pairs (number of hours, number of cars washed).
- b. Graph the ordered pairs on the coordinate plane at the right. Then describe the graph.



10. **ERASERS** Erasers cost 5 cents each at the school store. The table shows this relationship.

Cost of Erasers	
Number of Erasers	Cost (¢)
1	5
2	10
3	15
4	20

- a. List this information as ordered pairs (number of erasers, cost).
- b. Graph the ordered pairs. Then describe the graph.



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