

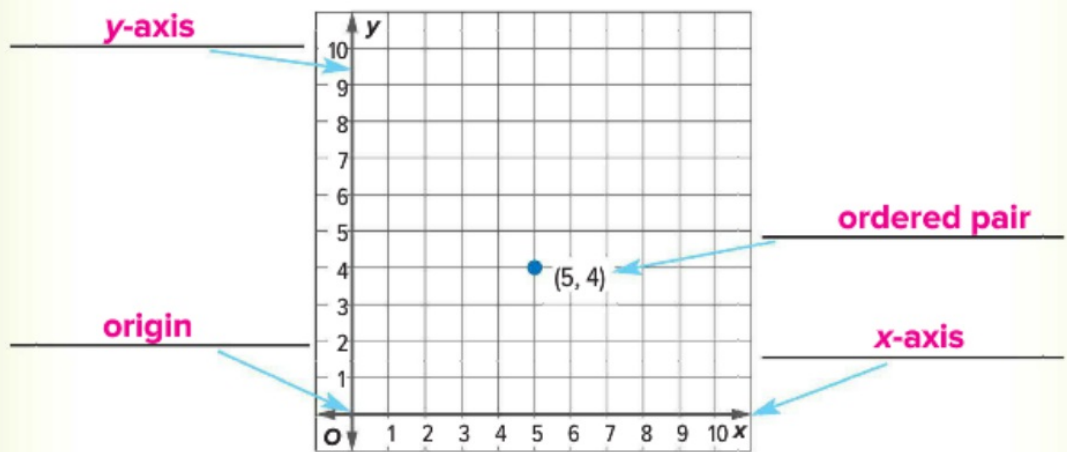
Vocabulary Start-Up



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.

Coordinate Plane



Essential Question

HOW do you use equivalent rates in the real world?

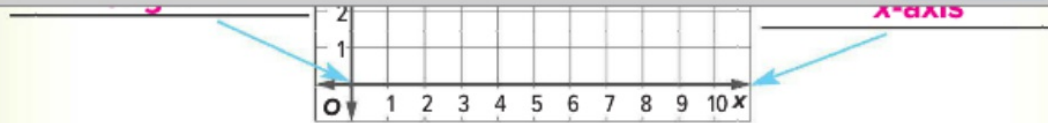
Vocabulary

- 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
- MP Mathematical Practices**
1, 3, 4




MP 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.

(3 , 17)

minutes yards

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

Shade the circle(s) that applies.

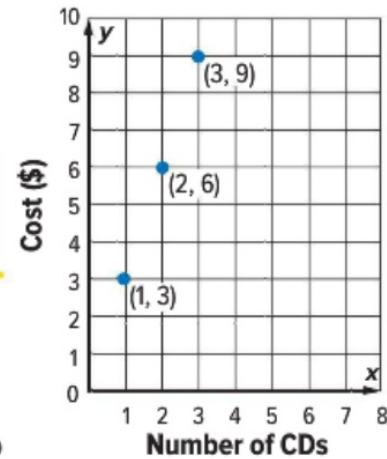
- | | |
|---------------------------|--------------------------|
| ① Persevere with Problems | ⑤ Use Math Tools |
| ② Reason Abstractly | ⑥ Attend to Precision |
| ③ Construct an Argument | ⑦ Make Use of Structure |
| ④ Model with Mathematics | ⑧ Use Repeated Reasoning |

FINISH



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.

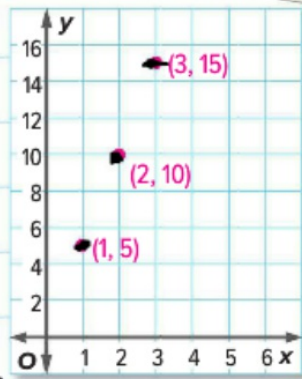
So, the cost increases by \$3 for every CD created.

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).

Gloria's 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.



The graph shows that Gloria's earnings increase by \$5 each hour.

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of her scrapbook.

- 3.** 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).

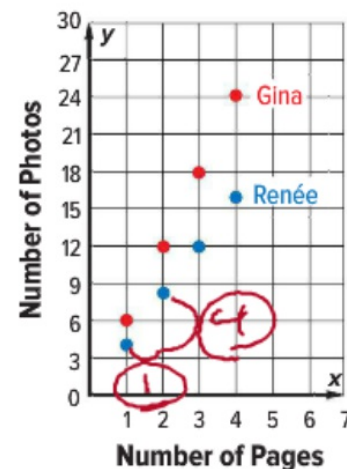
Renée's Scrapbook		
Pages, x	Photos, y	(x, y)
1	4	(1, 4)
2	8	(2, 8)
3	12	(3, 12)
4	16	(4, 16)

Gina's Scrapbook		
Pages, x	Photos, y	(x, y)
1	6	(1, 6)
2	12	(2, 12)
3	18	(3, 18)
4	24	(4, 24)

- 4.** 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.



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?

The ratio of photos to pages for Marta's book is 5:1. On a graph, the line would appear steeper than the line for Renée, but less steep than the line for Gina.



each week while David saves \$15 each week. (Examples 1-3)

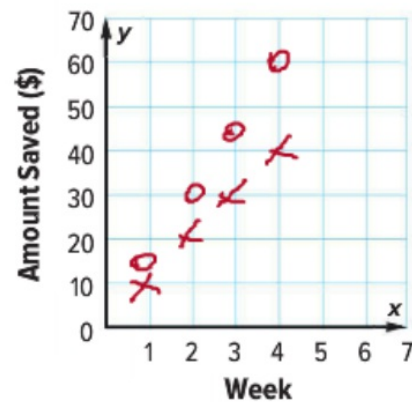
1. Make a table for each friend that shows the total amount saved for 1, 2, 3, and 4 weeks. List the information as ordered pairs (weeks, total dollars saved).

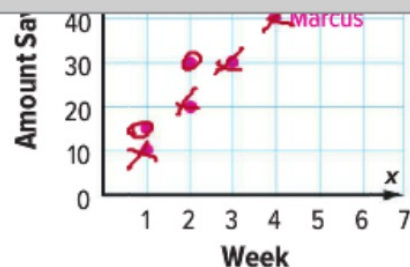
Show your work.

X Marcus		
Weeks, x	Total Saved (\$), y	(x, y)
1	10	(1, 10)
2	20	(2, 20)
3	30	(3, 30)
4	40	(4, 40)

O David		
Weeks, x	Total Saved (\$), y	(x, y)
1	15	(1, 15)
2	30	(2, 30)
3	45	(3, 45)
4	60	(4, 60)

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?

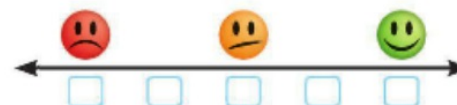
Sample answer: David's savings, \$15 per week, increases at a higher rate than Marcus's savings, \$10 per week. Both sets of points appear as straight lines. David's savings is shown on the graph as a steeper line.

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

Sample answer: A graph shows which ratio is greater when comparing 2 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.



FOLDABLES Time to update your Foldable!



Name _____ My Homework _____

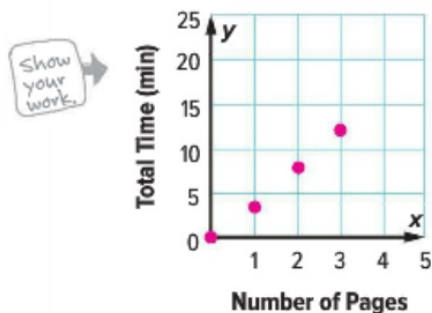
Independent Practice

Go online for Step-by-Step Solutions



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)

Graph the ordered pairs.



Samir's Reading		
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)

2. Describe the pattern in the graph.

The graph shows that Samir read 1 page every 4 minutes.

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 for 1, 2, 3, or 4 feet of fencing. List the information (number of feet, total cost).

of fencing. List the information as ordered pairs (feet of fencing, total cost).

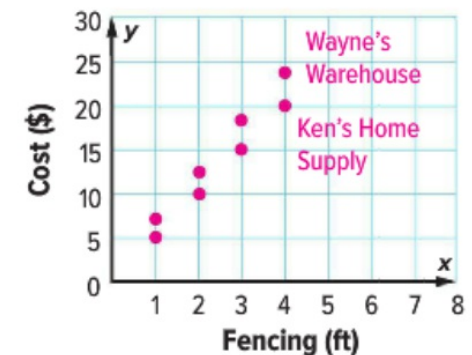
Ken's Home Supply		
Fencing (ft), x	Cost (\$), y	(x, y)
1	5	(1, 5)
2	10	(2, 10)
3	15	(3, 15)
4	20	(4, 20)

Wayne's Warehouse		
Fencing (ft), x	Cost (\$), y	(x, y)
1	6	(1, 6)
2	12	(2, 12)
3	18	(3, 18)
4	24	(4, 24)

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?

Sample answer: As the number of feet of fencing increases,
the cost at Wayne's Warehouse increases at a faster rate than
the cost at Ken's Home Supply. The cost at Wayne's Warehouse
is shown on the graph as a steeper line.



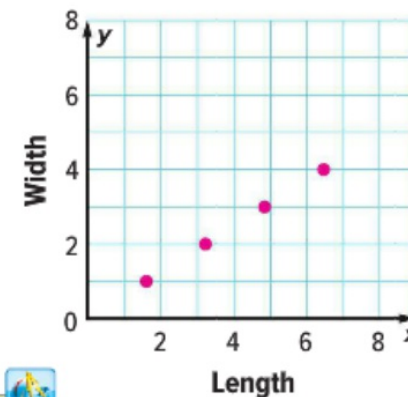


6. **MP Justify Conclusions** Patty's Pies made 2 peach pies using 10 cups of peaches. They made 3 pies using 15 cups of peaches and 4 pies using 20 cups of peaches. Predict how many cups of peaches would be needed to make 9 peach pies. Explain. 45 cups; The ratios $\frac{2}{10}$, $\frac{3}{15}$, $\frac{4}{20}$ show the number of pies to cups of peaches. $\frac{2}{10} = \frac{3}{15} = \frac{4}{20} = \frac{1}{5}$. The ratio $\frac{9}{45}$ is also equivalent to $\frac{1}{5}$. The ratio $\frac{9}{45}$ means that 45 cups of peaches will be needed to make 9 pies.

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**.

- 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?

Length, x	Width, y	(x, y)
1.618	1	(1.618, 1)
3.236	2	(3.236, 2)
4.854	3	(4.854, 3)
6.472	4	(6.472, 4)



The area of the first rectangle in the table is 1.618 square units. The areas increase to 6.472, 14.562, and 25.888.



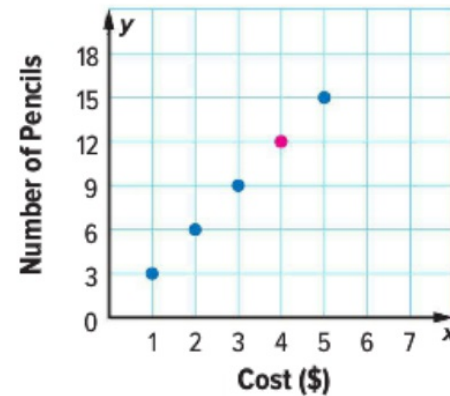


Length



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. **Sample answer: Lauren earns \$7 an hour tutoring. Make a table showing the relationship between the number of hours she tutors and the amount of money she earns.**
9. **MP Persevere with Problems** Give the coordinates of the point located halfway between $(2, 1)$ and $(2, 4)$. **$(2, 2.5)$**
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.
Sample answer: The points at $(1, 3)$, $(2, 6)$, $(3, 9)$, and $(5, 15)$ represent a rate equivalent to $1:3$. The rate $4:12$ is equivalent to $1:3$. So, the cost of 12 pencils is \$4.



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