Name _____

Home-School Connection
Topic **16** (English)

Coordinate Geometry

Dear Family,

In this topic, your child will be using ordered pairs to name and plot points on a coordinate grid. He or she will also be learning to plot ordered pairs from a table of x- and y-values and then graphing the points to form a line. He or she will also solve problems by describing continuous data shown on a line graph.

Here is an activity that you can do with your child to help him or her understand ordered pairs and plotting points on a coordinate grid.

_____

Make a Neighborhood Map

Materials: pencil, coordinate grid

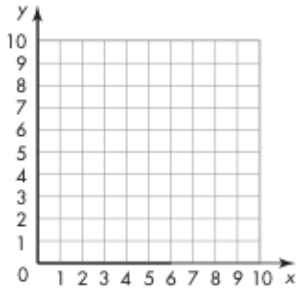
Step 1: Using a coordinate grid, help your child make a simple 10×10 map of the neighborhood around your home.

Step 2: Show an upward arrow along the vertical scale and an arrow along the horizontal scale. Label the vertical axis y and the horizontal axis x.

Step 3: Use estimation to help your child place local landmarks on the grid.

Step 4: Explain that the x-coordinate names the distance from zero (origin) along the x-axis and that the y-coordinate names the distance from the origin along the y-axis.

Step 5: Ask your child questions such as: *I am at the bank. What are the coordinates here?* or *I am at the grocery store. How do I walk home?*



Name _____

Topic **16**
Vocabulary Cards

coordinate grid	**coordinate grid** A grid that makes it easy to locate points on a plane by using an ordered pair of numbers.
***x*-axis**	***x*-axis** The horizontal axis in a graph or coordinate grid.
***y*-axis**	***y*-axis** The vertical axis in a graph or coordinate grid.

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origin	**origin** The point at which the *x*-axis and the *y*-axis of a coordinate plane intersect. The origin is represented by the ordered pair (0, 0).
ordered pair	**ordered pair** A pair of numbers used to locate a point on a coordinate grid.
***x*-coordinate**	***x*-coordinate** The first number in an ordered pair which names the distance from the origin along the *x*-axis.

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***y*-coordinate**	***y*-coordinate** The second number in an ordered pair which names the distance from the origin along the *y*-axis.

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Reteaching Master

Name _____

Reteaching
16-1

Ordered Pairs

Locating a point on a coordinate grid

The ordered pair (5, 7) describes the location of Point *A*.

(5, 7)

The first number tells how far to move to the right along the *x*-axis from zero.

This number is called the *x*-coordinate.

The second number tells how far to move up from the number on the *x*-axis.

This number is called the *y*-coordinate.

Locating a point from an ordered pair

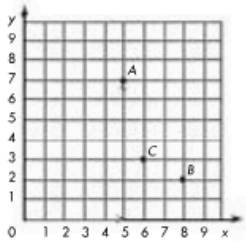
Step 1: Start at zero.

Step 2: Move 5 spaces to the right.

Step 3: Move 7 spaces up.

The ordered pair for *B* is (8, 2).

The ordered pair for *C* is (6, 3).



Name the point that is located by each ordered pair.

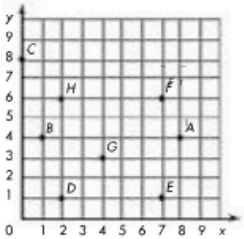
1. (7, 1) E
2. (2, 6) H
3. (0, 8) C
4. (4, 3) G

Write the ordered pair for each point.

5. *F* (7, 6)
6. *B* (1, 4)
7. *D* (2, 1)
8. *A* (8, 4)

9. Name two pairs of points that share the same *x*-coordinate.

H and *D*; *F* and *E*



Practice Master

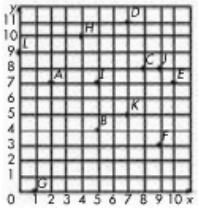
Name _____

Practice
16-1

Ordered Pairs

Name the point that is located by each ordered pair.

1. (9, 3) F
2. (1, 0) G
3. (7, 5) K
4. (5, 7) I

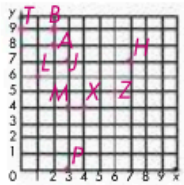


Write the ordered pair for each point.

5. *D* (7, 11)
6. *C* (8, 8)
7. *E* (10, 7)
8. *L* (0, 9)

Plot and label each point on the grid to the right.

9. *M*(3, 4)
10. *Z*(6, 5)
11. *T*(0, 9)
12. *X*(4, 4)
13. *P*(3, 0)
14. *A*(2, 8)
15. *H*(7, 7)
16. *B*(2, 9)
17. *J*(3, 7)
18. *L*(1, 6)



19. Which is the ordered pair for a point that is 7 units to the right of zero along the *x*-axis and 8 units above it?

A (8, 7)
B (7, 8)
C (1, 7)
D (1, 8)

20. Why are (4, 6) and (6, 4) not at the same point on a grid?

Sample answer: The first number tells how far to move to the right from 0, and the second number tells how far to move up from there on the grid.

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Reteaching
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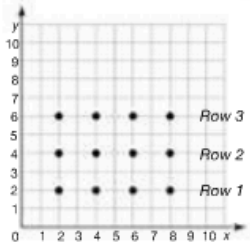
Distances on a Coordinate Plane

Jocelyn is going to plant carrots in rows. She is using a coordinate grid to help her arrange the rows.



How long is each row?

Compare the ordered pairs at each *end* of Row 1: (2, **2**) (8, **2**)

The *y*-values are the same, so you know the row is horizontal.

The *x*-values are different. You can subtract the *x*-values to find the length of the row.
$8 - 2 = 6$

The length of Row 1 is 6 units.

How far away is the first row from the third row?

Compare the first ordered pairs from Rows 1 and 3: (**2**, 2) (**2**, 6)

The *x*-values are the same, so you know the distance is vertical. To find the distance between the first and third rows, subtract the *y*-values.
$6 - 2 = 4$

The distance between the first row and the third row is 4 units.

Find the distance between the ordered pairs.

1. (2, 2), (8, 2) 6 units
2. (3, 4), (3, 9) 5 units
3. (8, 4), (1, 4) 7 units
4. (1, 9), (9, 9) 8 units
5. (6, 1), (6, 5) 4 units
6. (1, 9), (1, 1) 8 units
7. If the ordered pairs (1, 4) and (9, 4) are connected to make a line, is the line vertical or horizontal? Horizontal

Practice Master

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16-2

Distances on a Coordinate Plane

For **1** through **12**, find the distance between the ordered pairs. You can use grid paper to help.

1. (1, 7), (5, 7) 4 units
2. (3, 9), (3, 1) 8 units
3. (2, 6), (2, 0) 6 units
4. (12, 2), (1, 2) 11 units
5. (2, 7), (2, 8) 1 unit
6. (1, 5), (5, 5) 4 units
7. (0, 1), (0, 3) 2 units
8. (15, 9), (4, 9) 11 units
9. (8, 4), (8, 8) 4 units
10. (7, 7), (7, 9) 2 units
11. (18, 7), (18, 13) 6 units
12. (16, 9), (16, 11) 2 units

13. On a map, a museum is located at (15, 17). A library is located at (2, 17). How many units away is the museum from the library? 13 units

14. Matthew has two friends who live on the same block. On a map, Matthew's house is located at (4, 2). Matthew's friend Josh lives at (4, 1). Their mutual friend Kenny lives at (4, 8). Which friend lives farther from Matthew?
Ken; He lives 6 units from Matthew.

15. On a map, a costume store is located at (18, 7). A general store is located at (11, 7). How many units away is the costume store from the general store?
A 6 units **B** 7 units **C** 8 units **D** 9 units

16. On a map, John is standing at (11, 11). His friend Lucy is standing at (1, 11). John took 10 steps to the right. Is he standing with Lucy now?
No, 10 steps to the right puts him at (21, 11), not (1, 11).

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Reteaching
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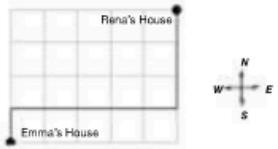
Problem Solving: Solve a Simpler Problem

Read	Rena's friend Emma is coming to visit her. Rena made her the map below showing Emma the way to her house.  How many blocks does Emma have to travel to get to Rena's house?
Plan & Solve	First, break the problem into simpler problems. **First problem:** Following the map, Emma has to travel north before turning east. How far does she have to travel north? *1 block north*
Plan & Solve	**Second problem:** Emma has to travel east before turning north. How far does she have to travel east? *5 blocks east*
Plan & Solve	**Third problem:** Emma now has to travel north to arrive at Rena's house. How far does she have to travel north? *3 blocks north*
Check	I can count the blocks and follow the route to check my calculations. Traveling 1 block north, 5 blocks east, and 3 blocks north will get Emma to Rena's house. Emma travels 9 blocks.

Use the information in the graph above to answer the following problems.

1. When her visit is over, Emma will use the same route to return back to her home. How many blocks will Emma have to travel for the entire trip to get to Rena's house and back home again?

   18 blocks

2. When Emma returns home, explain how she will travel.

   3 blocks south, 5 blocks west, and 1 block south

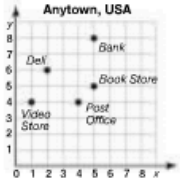
Practice Master

Name _____

Practice
16-3

Problem Solving: Solve a Simpler Problem

For **1** and **2**, use the graph to the right.



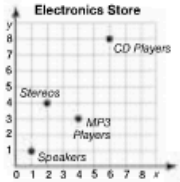
1. Mike is going from the video store to the deli to the post office. How many units does he travel?

   7 units

2. Raja is going from the bank to the post office to the video store. Does he travel more units than Mike?

   Yes, Raja walks 8 units.

For **3** and **4** use the graph to the right.



3. Stephanie walked from the CD players to the MP3 players to the stereos. How many units did she walk?

   10 units

4. Jule walked from the speakers to the stereos to the MP3 players. How many units did he walk?

   7 units

5. Use the graph from Problems 1 and 2. Which location is the farthest from the bank?

   A Video Store **B** Deli **C** Post Office **D** Book Store

6. Sal made a map of his neighborhood. According to his map, Sal's house is 6 units away from the grocery store. The grocery store is 5 units away from the coffee shop. The coffee shop is 1 unit from Sal's house. How is this possible?

   The coffee shop is on the way to the grocery store.

Reteaching Master

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Patterns and Graphing

Ron makes $5 every hour. A rule like this can be used to create a data table. The data can be plotted on a coordinate grid.

How to graph an rule:

Step 1:

Name three *x*-coordinates. Use the rule, substituting each *x*-coordinate to calculate each *y*-coordinate. Put the ordered pairs into the table.

Step 2:

Use grid paper. Choose an interval for each axis. Label and number the axes.

Choose the starting point and ending point for each axis.

Step 3:

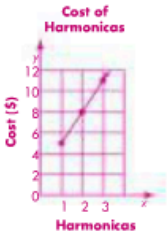
Graph the data by using the coordinates for each set of data as a point. Connect all the points in a straight line. Title your graph.

STEP 1

$y = 5x$	
x-Hours	*y*-Earnings
0	0
1	5
2	10
3	15

1. Graph the points from the table below to show the cost of buying harmonicas. Let *x* equal the number of harmonicas, and let *y* equal the cost of each harmonica. Harmonicas are available online for $3 each, plus a single shipping charge of $2.

$y = 3x + 2$	
x	*y*
1	5
2	8
3	11



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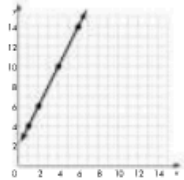
Patterns and Graphing

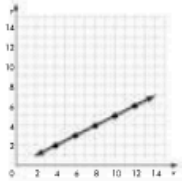
In **1** and **2** create a data table from the points plotted on the graph.

1.



x	*y*
1	4
2	6
4	10
6	14

2.



x	*y*
12	6
10	5
8	4
6	3
4	2

3. Janice is 7 years older than Tam. Complete the table, and then graph this situation.

Check students' graphs.

Tam *x* (years)	Janice *y* (years)
2	9
4	11
6	13
8	15

4. There are 4 cupcakes in every package. Complete the table, and then graph this situation.

x (number of packages)	*y* (number of cupcakes)
1	4
2	8
3	12
4	16
5	20

5. Tickets to the River Dell Middle School concert cost $6 apiece. Complete the table, and then graph this situation.

x (tickets sold)	*y* (money received)
1	$6
2	$12
3	$18
4	$24
5	$30

6. A graph includes the ordered pair (2, 4). Write two different rules that would be possible for this graph. Explain how you found your answer.

The *y*-value is 2 times the *x*-value; the *y*-value is 2 greater than the *x*-value. Both are possible because their solutions include the ordered pair listed.

Reteaching Master

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Reteaching
16-5

More Patterns and Graphing

Lila and Steve are saving money. Steve starts with no money and Lila starts with $6. Each deposits $2 a day in to a savings account.

Graph the relationship between the amount of money each person saves. Let x = Lila's money and y = Steve's money.

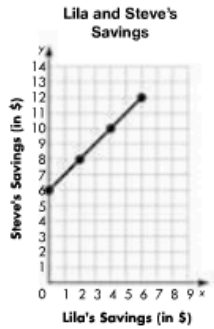
Choose 3 x-values.

Make a table of ordered pairs.

Graph the ordered pairs and draw a line.

Every x-value determines a y-value, so you can find the value of y for each value of x.

	Lila	Steve
Start	0	6
Week 1	2	8
Week 2	4	10
Week 3	6	12



For **1** through **3**, use the information below.

Rule for y_1: Add 3 to the x-value.
Rule for y_2: Add 6 to the x-value.

x	y_1	y_2
1	4	7
2	**5**	**8**
3	6	**9**
4	**7**	10
5	8	11
6	9	**12**
7	**10**	**13**

1. Find the missing information in the table using the given rules.
See table

2. Find the values of y_1 and y_2 when $x = 10$.
13, 16

3. Graph the relationship between y_1 and y_2 on a coordinate grid.
Check students' graphs.

Practice Master

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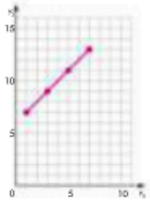
Practice
16-5

More Patterns and Graphing

For **1** and **2**, Graph the corresponding coordinates of y_1 and y_2. Describe the relationship between the two sequences.

1.

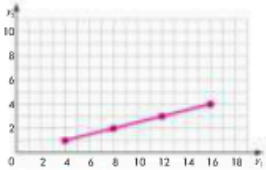
Day	y_1	y_2
1	1	7
2	3	9
3	5	11
4	7	13



Sample answer: y_2 is always 6 greater than y_1.

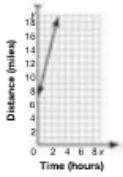
2.

Week	y_1	y_2
2	4	1
3	8	2
4	12	3
5	16	4



Sample answer: y_2 is always $\frac{1}{4}$ of y_1.

3. Dean is on a hike. The graph shows how far away he is from a camp site. How far away is he after 2 hours?



A 5 miles **C** 15 miles
B 10 miles **D** 20 miles

4. Ian gets $9 for each hour he works and $10 for each day he works. To find out how much he makes in a day, he made the equation $y = 9x + 10x$, where x is the number of hours he works. Explain why Ian's equation will not tell him how much he makes in a day.

Sample answer: x can only represent hours and in his equation x also represents days.

Reteaching Master

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Reteaching
16-6

Problem Solving: Work Backward

The movement of point *A* on a coordinate grid is described in the chart. What are the coordinates of *A*'s starting location?

Time	Starting		1		2		Ending
Position	(*x*, *y*)		(9, 7)		(9, 5)		(6, 5)
Units/Direction		4→		2↓		3←	

Read and Understand

What do you know? — The movements of point *A* and its final location

What are you trying to find? — *A*'s starting location

Plan and Solve

Think: *Running the clock back in time from A's final location will place A back at its starting location.* — Since the clock is running in reverse, all directions will be reversed.

Solve the problem.

Time	Ending		2		1		Starting
Position	(6, 5)		(9, 5)		(9, 7)		(5, 7)
Units/Direction		3→		2↑		4←	
Change		(6 + **3**, 5)		(9, **5** + **2**)		(9 − **4**, 7)	

Write the answer in a complete sentence. — *A*'s starting location is (5, 7).

Look Back and Check

Is your answer correct? — Yes, (**5** + 4 − 3, **7** − 2) is (6, 5).

Write the reverse for each of the following location changes.

1. 3↑ 3↓ **2.** 6→ 6← **3.** 4← 4→ **4.** 2↓ 2↑

Write the new location for each of the following starting points and location changes.

5. (4, 3), 2↑ (4, 5) **6.** (5, 3), 6→ (11, 3) **7.** (8, 5), 3↓ (8, 2)

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Practice Master

Name _____

Practice
16-6

Problem Solving: Work Backward

Work backward to find each starting position.

1. **Starting** (*x*, *y*). 10, 20
   4 units→ (14, 20)
   2 units↑ (14, 22)
   5 units← (9, 22) **Ending**
2. **Starting** (*x*, *y*). 5, 8
   2 units↓ (5, 6)
   3 units→ (8, 6)
   1 unit↑ (8, 7) **Ending**
3. **Starting** (*x*, *y*). 5, 5
   8 units↑ (5, 13)
   4 units→ (9, 13)
   6 units→ (15, 13) **Ending**
4. Martha must finish her math quiz in 35 minutes. She knows that there are 10 multiple-choice questions and 5 word problems. If each word problem takes her exactly 3 minutes to complete, how much time can she spend on each multiple-choice question?
   2 minutes
5. Kori arrived at school on time, at exactly 8:30 A.M. If it took him 15 minutes to walk to school, 10 minutes to eat breakfast, and 18 minutes to get ready, what time did he wake up this morning?
   A 7:37 A.M. **C** 7:57 A.M.
   B 7:47 A.M. **D** 8:07 A.M.
6. Jerry used his $100 gift certificate to go shopping. He bought pants for $25, a shirt for $15, and socks for $3. Then he bought a pair of shoes. Jerry still has $27 left. How much were the shoes that he bought? Explain how you know.
   $30; Jerry's other purchases were $43, and since he had $27 left, he spent a total of $73.

P16-6