EUREKA MATH PUSD

A Story of Units

Pleasanton UNIFIED SCHOOL DISTRICT Mathematics Curriculum

GRADE 5 • MODULE 6

Problem Solving with the Coordinate Plane

Solutions

Homework

Video tutorials: http://bit.ly/eurekapusd
Info for parents: http://bit.ly/pusdmath

For video tutorials on many of these problems, please visit http://bit.ly/engageportal

Eureka Math

DISCLAIMER: EngageNY is regularly updating their curriculum, so some problems in my answer key may no longer match future versions of this module.

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GRADE 5 • MODULE 6

Problem Solving with the Coordinate Plane

NOTE: Student sheets should be printed at 100% scale to preserve the intended size of figures for accurate measurements. Adjust copier or printer settings to *actual size* and set page scaling to *none*.

Name _____ Date _____

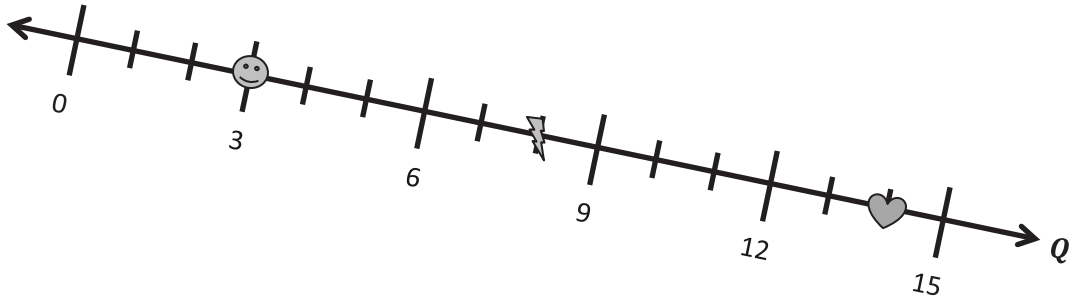
1. Answer the following questions using number line Q, below.

   a. What is the coordinate, or the distance from the origin, of the ☺? 3

   b. What is the coordinate of ⚡? 8

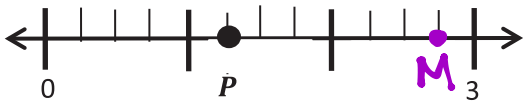
   c. What is the coordinate of ♥? 14

   d. What is the coordinate at the midpoint of ⚡ and ♥? 11



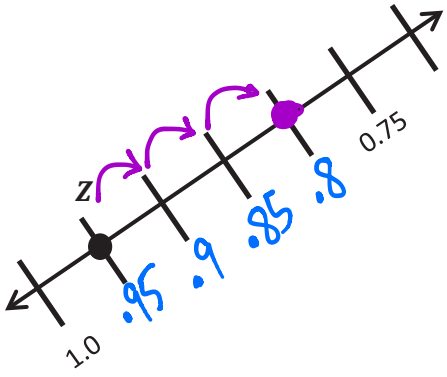
2. Use the number lines to answer the questions.

Plot T so that its distance from the origin is 10.

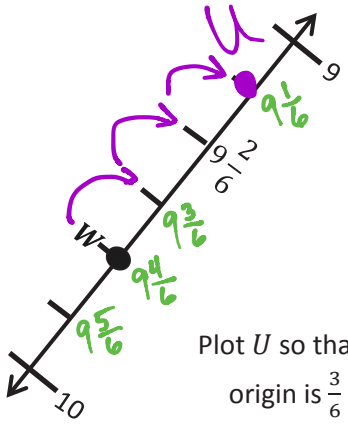


Plot M so that its distance is $\frac{11}{4}$ from the origin. What is the distance from P to M? $1\frac{3}{4}$ or $\frac{6}{4}$

$\frac{11}{4} = 2\frac{3}{4}$

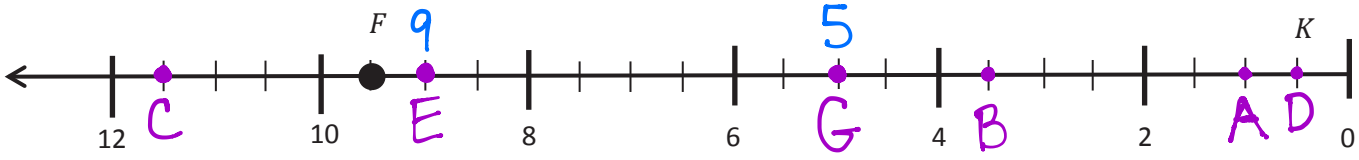


Plot a point that is 0.15 closer to the origin than Z.



Plot U so that its distance from the origin is $\frac{3}{6}$ less than that of W.

3. Number line $\boldsymbol{K}$ shows 12 units. Use number line $\boldsymbol{K}$, below, to answer the questions.



a. Plot a point at 1. Label it A.

b. Label a point that lies at $3\frac{1}{2}$ as B.

c. Label a point, C, whose distance from zero is 8 units farther than that of B.

The coordinate of C is $11\frac{1}{2}$.

d. Plot a point, D, whose distance from zero is $\frac{6}{2}$ less than that of B.

The coordinate of D is $\frac{1}{2}$.

e. What is the coordinate of the point that lies $\frac{17}{2}$ farther from the origin than D?

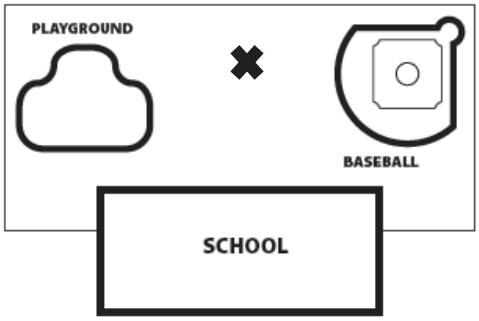
$\frac{17}{2} = 8\frac{1}{2}$

Label this point E. E is at 9.

f. What is the coordinate of the point that lies halfway between F and D?

Label this point G. G is at 5.

4. Mr. Baker's fifth-grade class buried a time capsule in the field behind the school. They drew a map and marked the location of the capsule with an ✖ so that his class can dig it up in ten years. What could Mr. Baker's class have done to make the capsule easier to find?

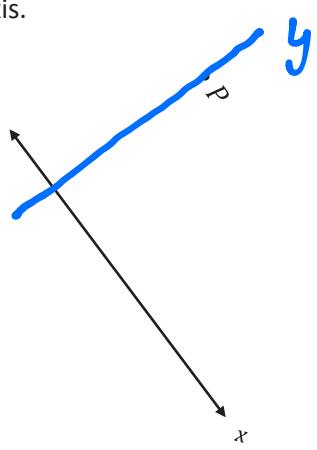


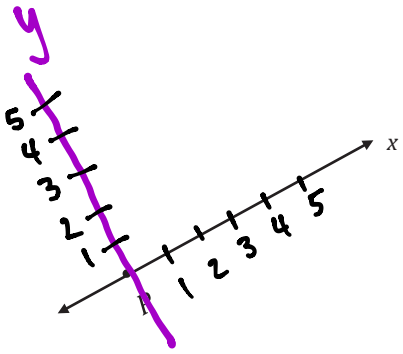
Answers will vary.

Measure the distance between the playground and the baseball field. Treat that distance like a number line. Determine where the X is.

Name _____ Date _____

1. a. Use a set square to draw a line perpendicular to the x-axis through point P. Label the new line as the y-axis.





b. Choose one of the sets of perpendicular lines above and create a coordinate plane. Mark 5 units on each axis, and label them as whole numbers.

2. Use the coordinate plane to answer the following.

a. Name the shape at each location.

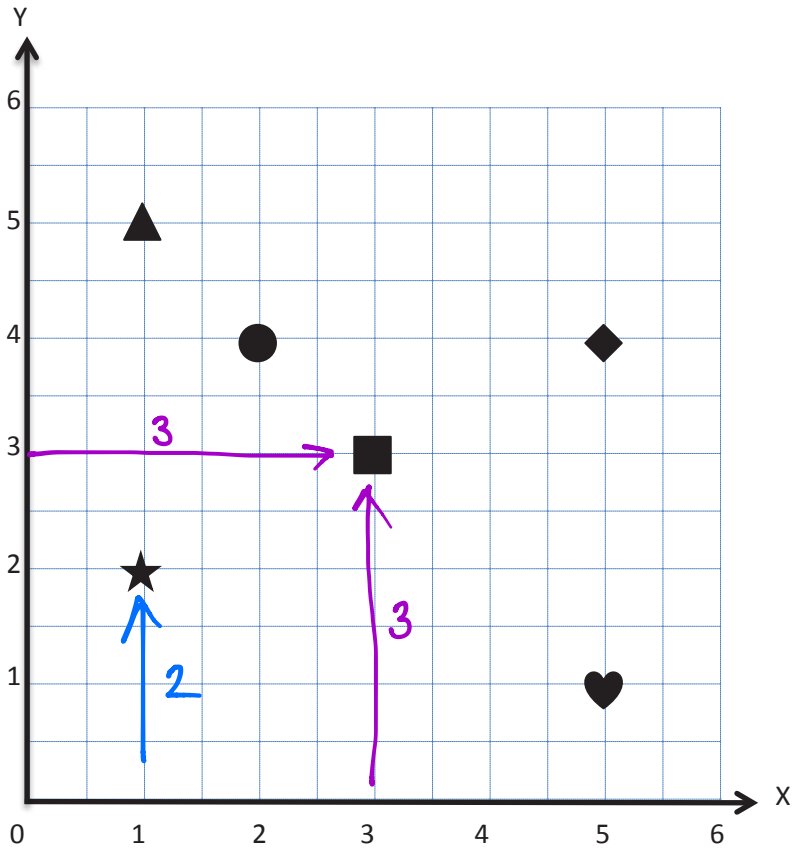
x-coordinate	y-coordinate	Shape
2	4	circle
5	4	diamond
1	5	triangle
5	1	heart

b. Which shape is 2 units from the x-axis?

star

c. Which shape has the same x- and y-coordinate?

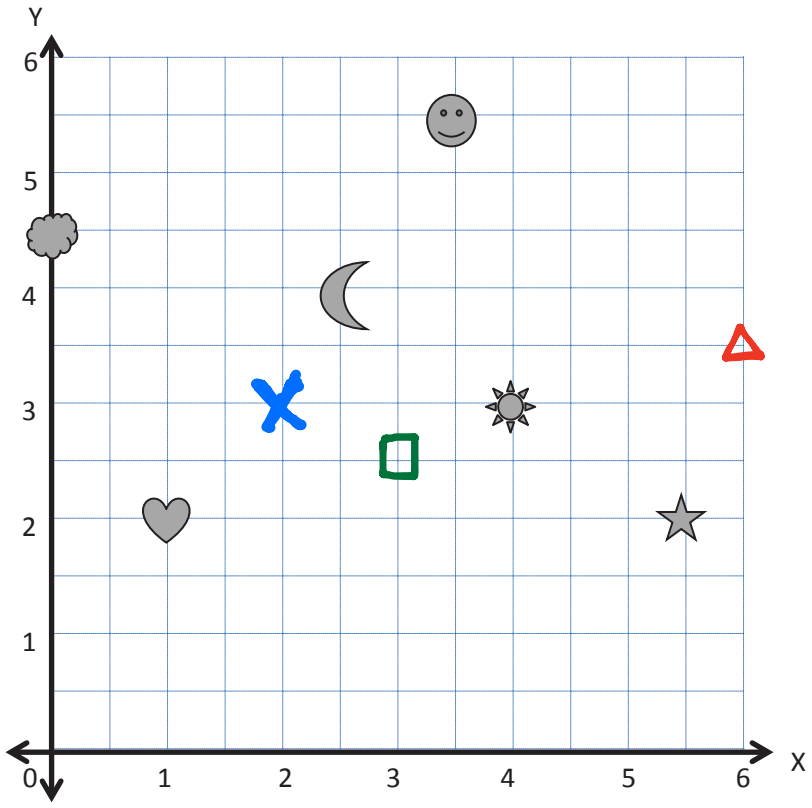
square



3. Use the coordinate plane to answer the following.

   a. Name the coordinates of each shape.

Shape	x-coordinate	y-coordinate
Moon	$2\frac{1}{2}$	4
Sun	4	3
Heart	1	2
Cloud	0	$4\frac{1}{2}$
Smiley Face	$3\frac{1}{2}$	$5\frac{1}{2}$



   b. Which 2 shapes have the same y-coordinate?

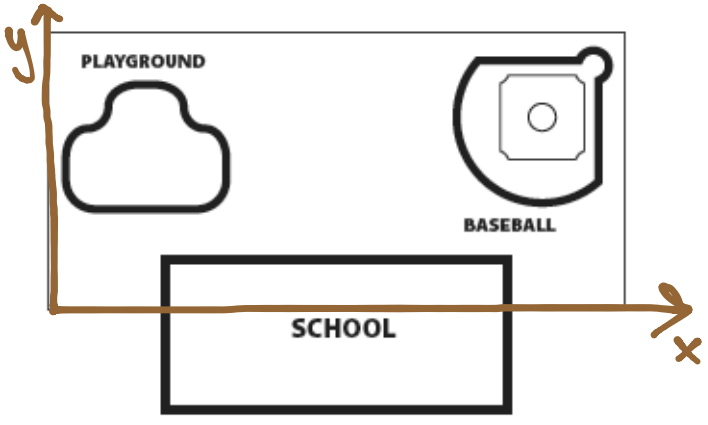
heart and star

   c. Plot an X at (2, 3).

   d. Plot a square at $(3, 2\frac{1}{2})$.

   e. Plot a triangle at $(6, 3\frac{1}{2})$.

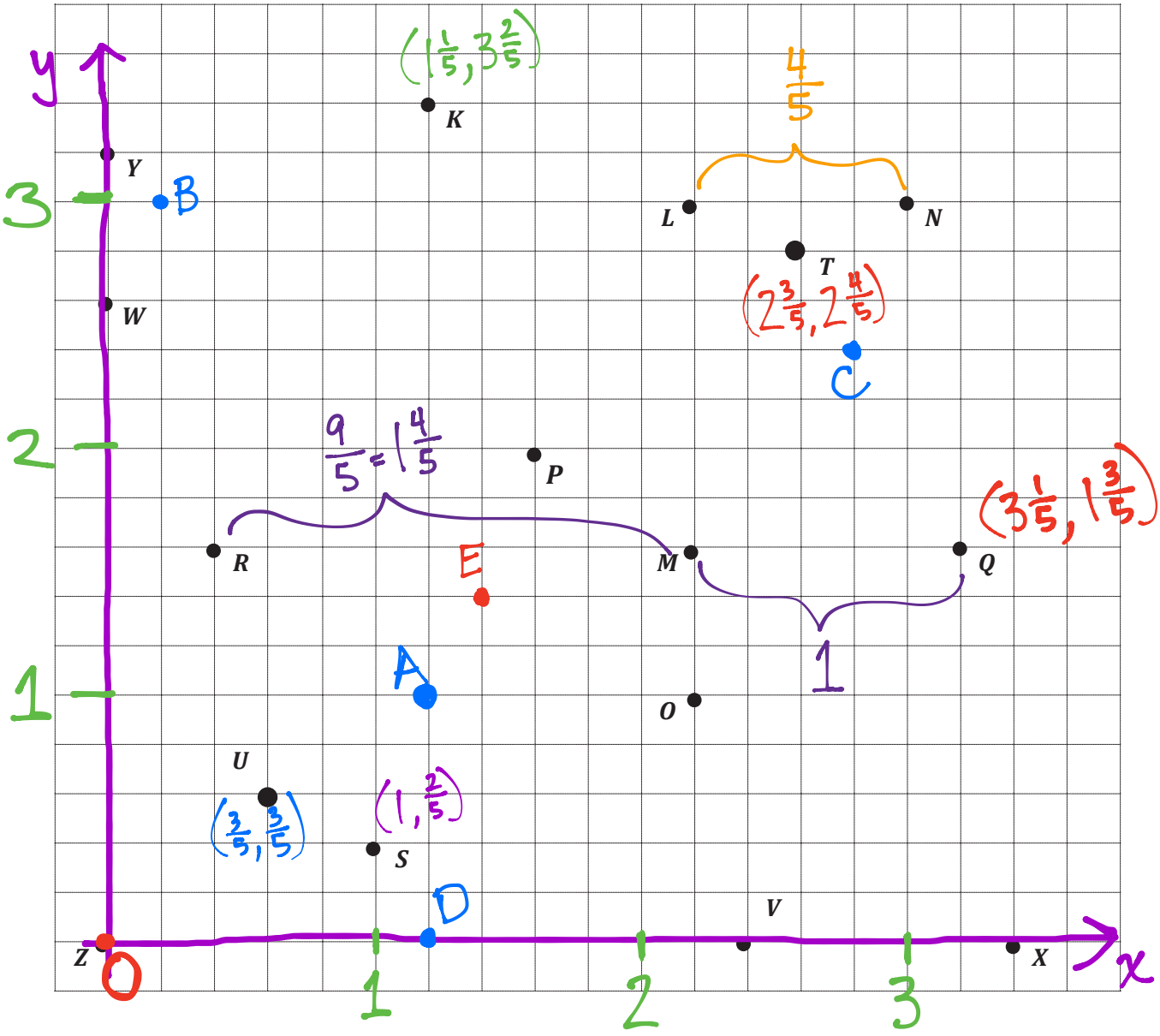
4. Mr. Palmer plans to bury a time capsule 10 yards behind the school. What else should he do to make naming the location of the time capsule more accurate?



He should also determine where to measure the 10 yards from. This is somewhere along the X axis.

Name _____ Date _____

1. Use the grid below to complete the following tasks.
   a. Construct a y-axis that passes through points Y and Z.
   b. Construct a perpendicular x-axis that passes through points Z and X.
   c. Label the origin as 0.
   d. The y-coordinate of W is $2\frac{3}{5}$. Label the whole numbers along the y-axis.
   e. The x-coordinate of V is $2\frac{2}{5}$. Label the whole numbers along the x-axis.



2. For all of the following problems, consider the points K through X on the previous page.

   a. Identify all of the points that have a y-coordinate of $1\frac{3}{5}$. R, M, Q

   b. Identify all of the points that have an x-coordinate of $2\frac{1}{5}$. O, M, L

   c. Which point is $1\frac{3}{5}$ units above the x-axis *and* $3\frac{1}{5}$ units to the right of the y-axis? Name the point and give its coordinate pair. Q

   d. Which point is located $1\frac{1}{5}$ units from the y-axis? K

   e. Which point is located $\frac{2}{5}$ units along the x-axis? R

   f. Give the coordinate pair for each of the following points.

   T: $(2\frac{3}{5}, 2\frac{4}{5})$ U: $(\frac{3}{5}, \frac{3}{5})$ S: $(1, \frac{2}{5})$ K: $(1\frac{1}{5}, 3\frac{2}{5})$

   g. Name the points located at the following coordinates.

   $(\frac{3}{5}, \frac{3}{5})$ U $(3\frac{2}{5}, 0)$ X $(2\frac{1}{5}, 3)$ L $(0, 2\frac{3}{5})$ W

   h. Plot a point whose x- and y-coordinates are equal. Label your point E. Answers will vary.

   i. What is the name for the point on the plane where the two axes intersect? Origin Give the coordinates for this point. (0 , 0)

   j. Plot the following points.

   A: $(1\frac{1}{5}, 1)$ B: $(\frac{1}{5}, 3)$ C: $(2\frac{4}{5}, 2\frac{2}{5})$ D: $(1\frac{1}{5}, 0)$

   k. What is the distance between L and N, or LN? $\frac{4}{5}$

   l. What is the distance of MQ? 1

   m. Would RM be greater than, less than, or equal to $LN + MQ$? Equal

   n. Leslie was explaining how to plot points on the coordinate plane to a new student, but she left off some important information. Correct her explanation so that it is complete.

   "All you have to do is read the coordinates; for example, if it says (4, 7), count four, then seven, and put a point where the two grid lines intersect."

She forgot to specify that 4 is on the X axis and that 7 is on the y axis.

Name _____ Date _____

Your homework is to play at least one game of *Battleship* with a friend or family member. You can use the directions from class to teach your opponent. You and your opponent should record your guesses, hits, and misses on the sheet as you did in class.

When you have finished your game, answer these questions.

1. When you guess a point that is a hit, how do you decide which points to guess next?

(Answers will vary.)

The next guess should be adjacent to the HIT.

2. How could you change the coordinate plane to make the game easier or more challenging?

(Answers will vary.)

A smaller coordinate plane makes the game easier.

A larger coordinate plane makes the game harder.

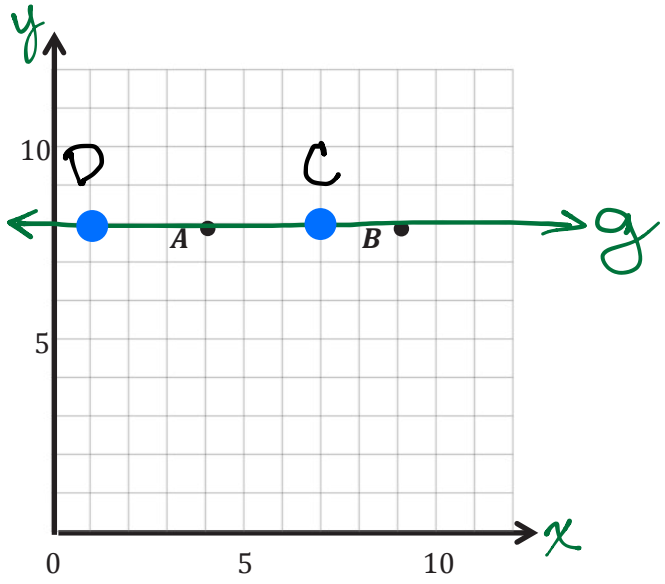
3. Which strategies worked best for you when playing this game?

(Answers will vary.)

Spread out my guesses hoping to hit something.

Name _____ Date _____

1. Use the coordinate plane to answer the questions.



   a. Use a straightedge to construct a line that goes through points A and B. Label the line g.
   b. Line g is parallel to the x -axis and is perpendicular to the y -axis.
   c. Draw two more points on line g. Name them C and D. (Answers will vary.)
   d. Give the coordinates of each point below.

      A: (4,8) B: (9,8)

      C: (7,8) D: (1,8)

   e. What do all of the points on line g have in common? The y coordinate is 8.

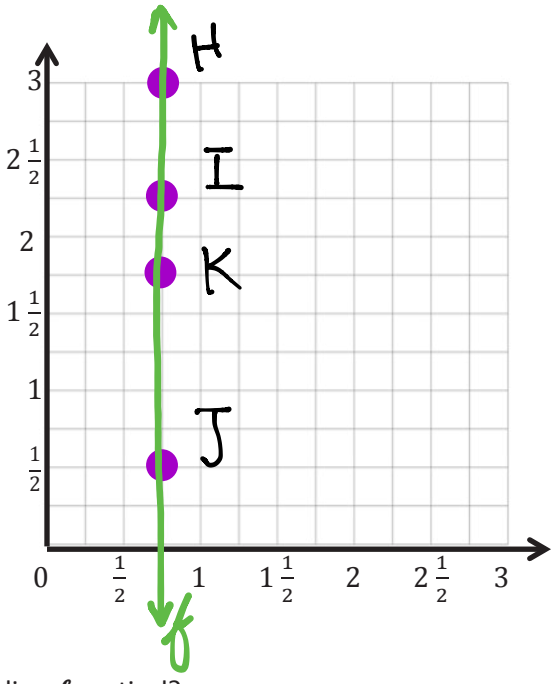
   f. Give the coordinates of another point that falls on line g with an x-coordinate greater than 25.

      (Answers will vary.) (100,8)

2. Plot the following points on the coordinate plane to the right.

   H: $(\frac{3}{4}, 3)$ I: $(\frac{3}{4}, 2\frac{1}{4})$

   J: $(\frac{3}{4}, \frac{1}{2})$ K: $(\frac{3}{4}, 1\frac{3}{4})$



   a. Use a straightedge to draw a line to connect these points. Label the line f.
   b. In line f, x = 3/4 for all values of y.
   c. Circle the correct word:

      Line f is *parallel* (*perpendicular*) to the x-axis.

      Line f is (*parallel*) *perpendicular* to the y-axis.

   d. What pattern occurs in the coordinate pairs that make line f vertical?

      The x coordinate is always 3/4.

3. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the x-axis? Circle your answer(s). Without plotting them, explain how you know.

a. (3.2, 7) and (5, 7) b. (8, 8.4) and (8, 8.8) c. $(6\frac{1}{2}, 12)$ and (6.2, 11)

The two points are the same distance above the x-axis.

4. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the y-axis? Circle your answer(s). Then, give 2 other coordinate pairs that would also fall on this line.

a. (3.2, 8.5) and (3.22, 24) b. $(13\frac{1}{3}, 4\frac{2}{3})$ and $(13\frac{1}{3}, 7)$ c. (2.9, 5.4) and (7.2, 5.4)

The two points are the same distance from the y-axis.

5. Write the coordinate pairs of 3 points that can be connected to construct a line that is $5\frac{1}{2}$ units to the right of and parallel to the y-axis.

a. $(5\frac{1}{2}, 2)$ b. $(5\frac{1}{2}, 4\frac{2}{3})$ c. $(5\frac{1}{2}, 3)$

6. Write the coordinate pairs of 3 points that lie on the y-axis.

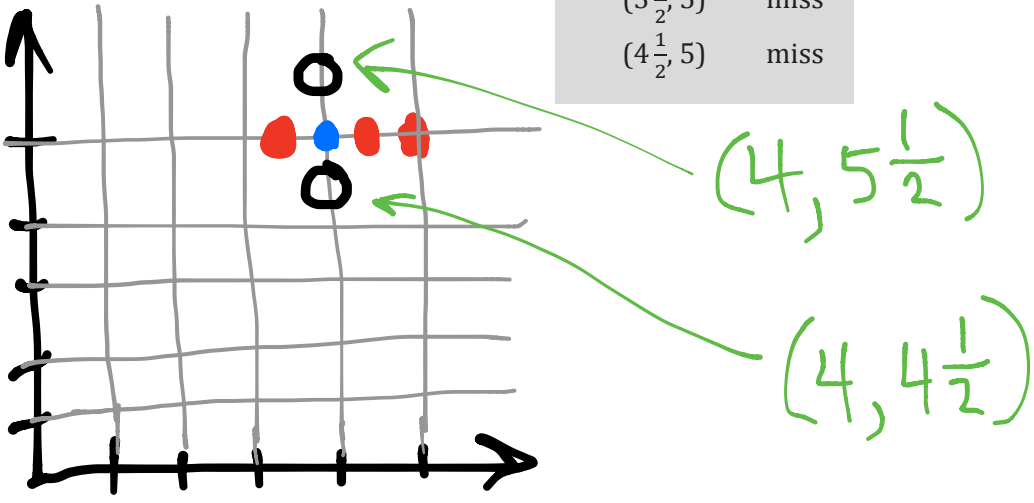
a. $(0, 2)$ b. $(0, 4\frac{1}{2})$ c. $(0, 3)$

Answers will vary.

7. Leslie and Peggy are playing *Battleship* on axes labeled in halves. Presented in the table is a record of Peggy's guesses so far. What should she guess next? How do you know? Explain using words and pictures.

(5, 5)	miss
(4, 5)	hit
$(3\frac{1}{2}, 5)$	miss
$(4\frac{1}{2}, 5)$	miss

She should guess immediately above or below the hit.



Name _____ Date _____

1. Plot and label the following points on the coordinate plane.

   C: (0.4, 0.4) A: (1.1, 0.4) S: (0.9, 0.5) T: (0.9, 1.1)

   a. Use a straightedge to construct line segments $\overline{CA}$ and $\overline{ST}$.

   b. Name the line segment that is perpendicular to the x-axis and parallel to the y-axis. ST

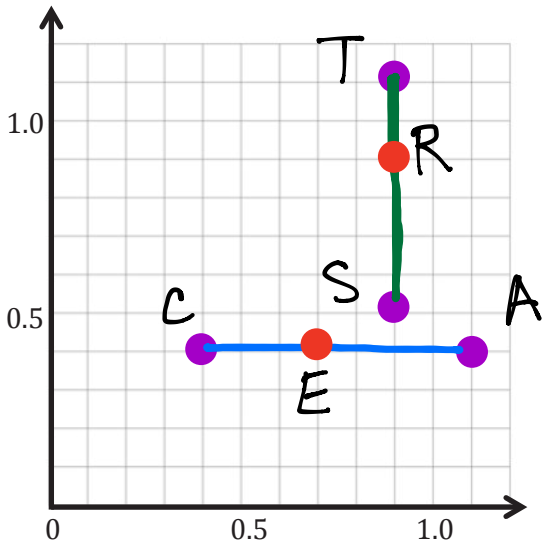
   c. Name the line segment that is parallel to the x-axis and perpendicular to the y-axis. CA

   d. Plot a point on $\overline{CA}$ and name it E. Plot a point on line segment $\overline{ST}$ and name it R.

   e. Write the coordinates of points E and R.

   E (0.7, 0.4) R (0.9, 0.9)

Answers will vary



2. Construct line $\boldsymbol{m}$ such that the y-coordinate of every point is $1\frac{1}{2}$, and construct line $\boldsymbol{n}$ such that the x-coordinate of every point is $5\frac{1}{2}$.

   a. Line $\boldsymbol{m}$ is $1\frac{1}{2}$ units from the x-axis.

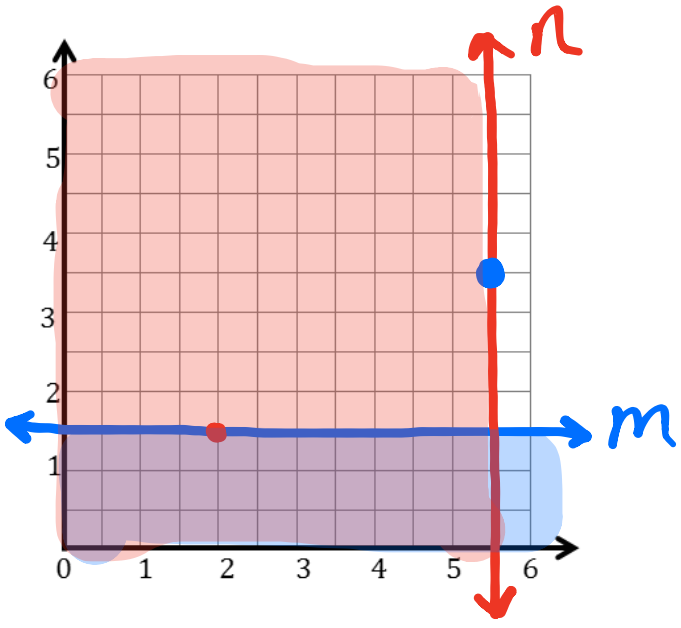
   b. Give the coordinates of the point on line $\boldsymbol{m}$ that is 2 units from the y-axis. $(2, 1\frac{1}{2})$

   c. With a blue pencil, shade the portion of the grid that is less than $1\frac{1}{2}$ units from the x-axis.

   d. Line $\boldsymbol{n}$ is $5\frac{1}{2}$ units from the y-axis.

   e. Give the coordinates of the point on line $\boldsymbol{n}$ that is $3\frac{1}{2}$ units from the x-axis. $(5\frac{1}{2}, 3\frac{1}{2})$

   f. With a red pencil, shade the portion of the grid that is less than $5\frac{1}{2}$ units from the y-axis.



3. Construct and label lines e, r, s, o on the plane below.

   a. Line e is 3.75 units above the x-axis.

   b. Line r is 2.5 units from the y-axis.

   c. Line s is parallel to line e but 0.75 farther from the x-axis.

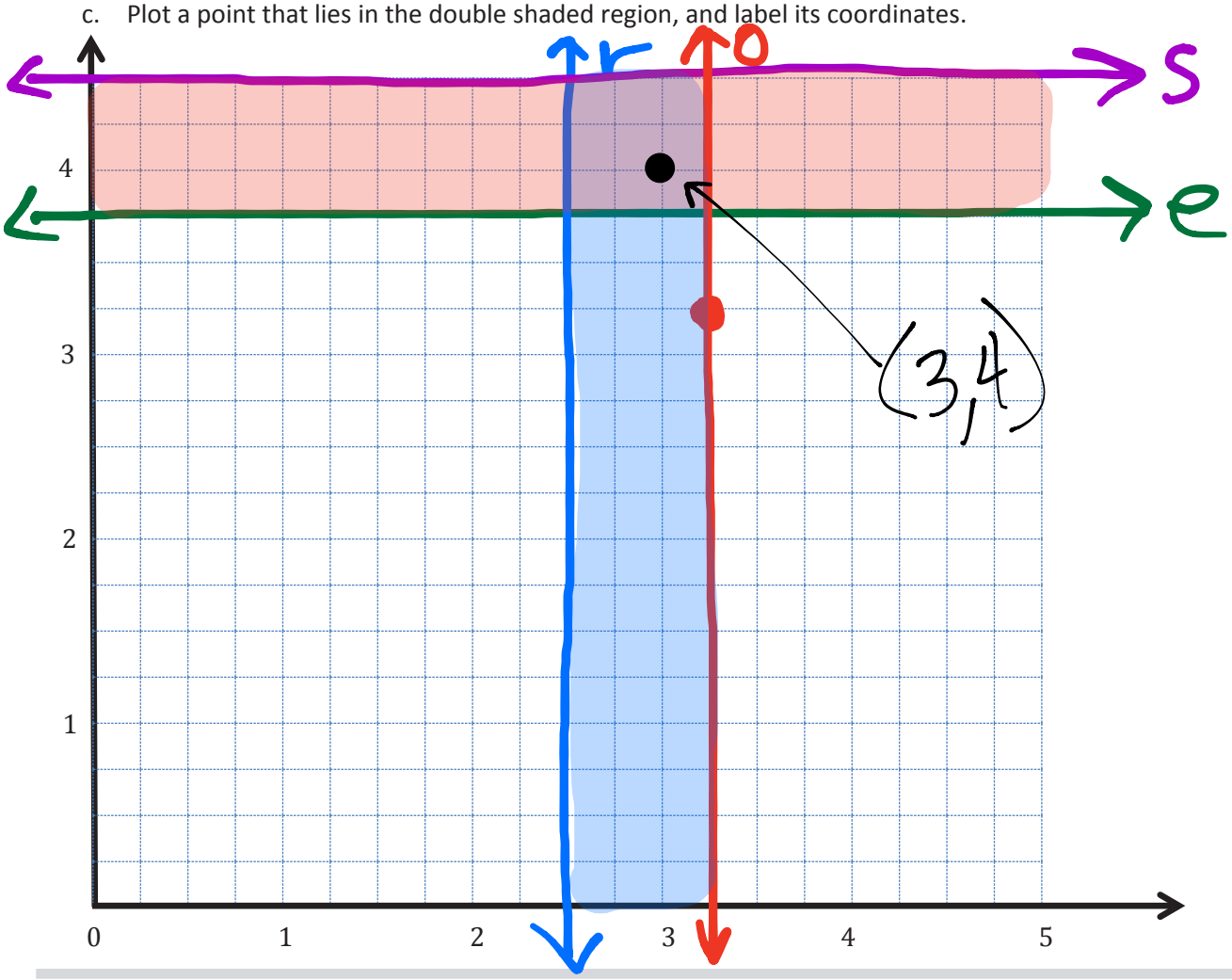
   d. Line o is perpendicular to lines s and e and passes through the point $(3\frac{1}{4}, 3\frac{1}{4})$.

4. Complete the following tasks on the plane.

   a. Using a blue pencil, shade the region that contains points that are more than $2\frac{1}{2}$ units and less than $3\frac{1}{4}$ units from the y-axis.

   b. Using a red pencil, shade the region that contains points that are more than $3\frac{3}{4}$ units and less than $4\frac{1}{2}$ units from the x-axis.

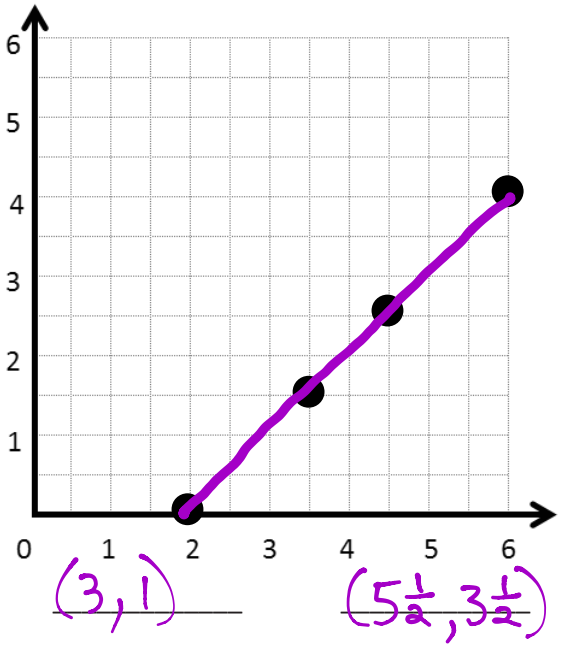
   c. Plot a point that lies in the double shaded region, and label its coordinates.



Name _____ Date _____

1. Complete the chart. Then, plot the points on the coordinate plane.

x	y	(x, y)
2	0	(2,0)
$3\frac{1}{2}$	$1\frac{1}{2}$	$(3\frac{1}{2}, 1\frac{1}{2})$
$4\frac{1}{2}$	$2\frac{1}{2}$	$(4\frac{1}{2}, 2\frac{1}{2})$
6	4	(6,4)



a. Use a straightedge to draw a line connecting these points.

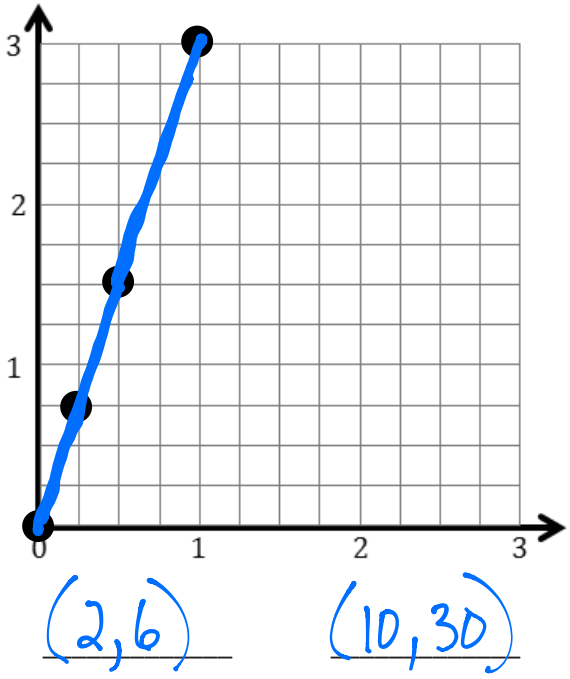
b. Write a rule showing the relationship between the x- and y-coordinates of points on this line.

$x - 2 = y$

c. Name two other points that are also on this line.

2. Complete the chart. Then, plot the points on the coordinate plane.

x	y	(x, y)
0	0	(0,0)
$\frac{1}{4}$	$\frac{3}{4}$	$(\frac{1}{4}, \frac{3}{4})$
$\frac{1}{2}$	$1\frac{1}{2}$	$(\frac{1}{2}, 1\frac{1}{2})$
1	3	(1,3)



a. Use a straightedge to draw a line connecting these points.

b. Write a rule showing the relationship between the x- and y- coordinates for points on the line.

$x \cdot 3 = y$

c. Name two other points that are also on this line.

3. Use the coordinate plane to answer the following questions.

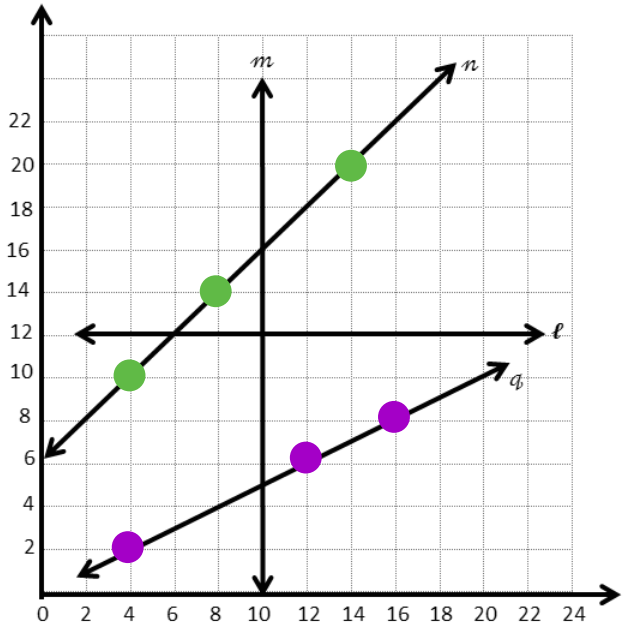
a. For any point on line m, the x-coordinate is 10.

b. Give the coordinates for 3 points that are on line n.

(4,10), (8,14), (14,20)

c. Write a rule that describes the relationship between the x- and y-coordinates on line n.

x+6=y



d. Give the coordinates for 3 points that are on line q.

(4,2), (12,6), (16,8)

e. Write a rule that describes the relationship between the x- and y-coordinates on line q.

x÷2=y also known as $\frac{x}{2}=y$

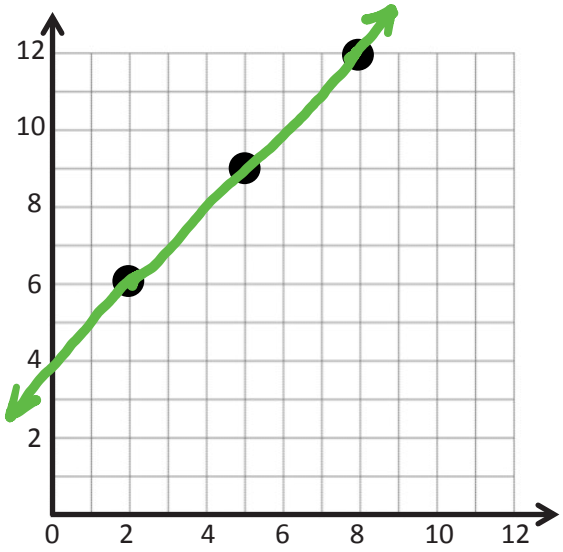
f. Identify a line on which each of these points lie.

i. (10, 3.2) m ii. (12.4, 18.4) n iii. (6.45, 12) ℓ iv. (14, 7) q

Name _____ Date _____

1. Complete this table such that each y-coordinate is 4 more than the corresponding x-coordinate.

x	y	(x, y)
2	6	(2, 6)
5	9	(5, 9)
8	12	(8, 12)



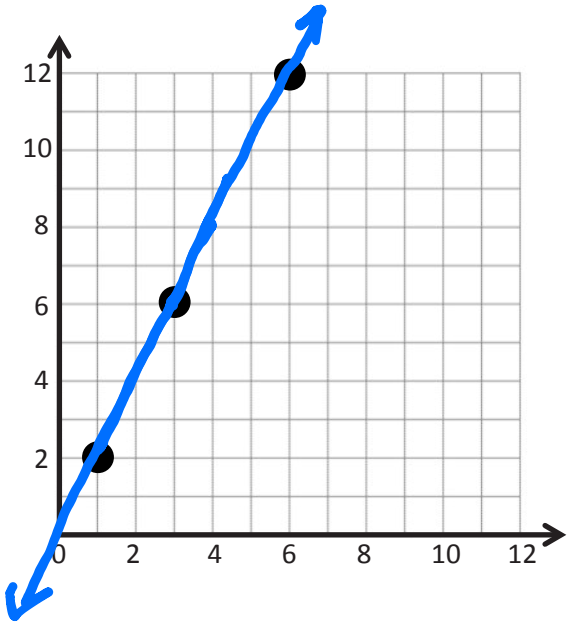
a. Plot each point on the coordinate plane.

b. Use a straightedge to construct a line connecting these points.

c. Give the coordinates of 2 other points that fall on this line with x-coordinates greater than 18.
(20, 24) and (34, 38)

2. Complete this table such that each y-coordinate is 2 times as much as its corresponding x-coordinate.

x	y	(x, y)
1	2	(1, 2)
3	6	(3, 6)
6	12	(6, 12)



a. Plot each point on the coordinate plane.

b. Use a straightedge to draw a line connecting these points.

c. Give the coordinates of 2 other points that fall on this line with y-coordinates greater than 25.
(13, 26) and (41, 82)

3. Use the coordinate plane below to complete the following tasks.

a. Graph these lines on the plane.

line ℓ: x is equal to y

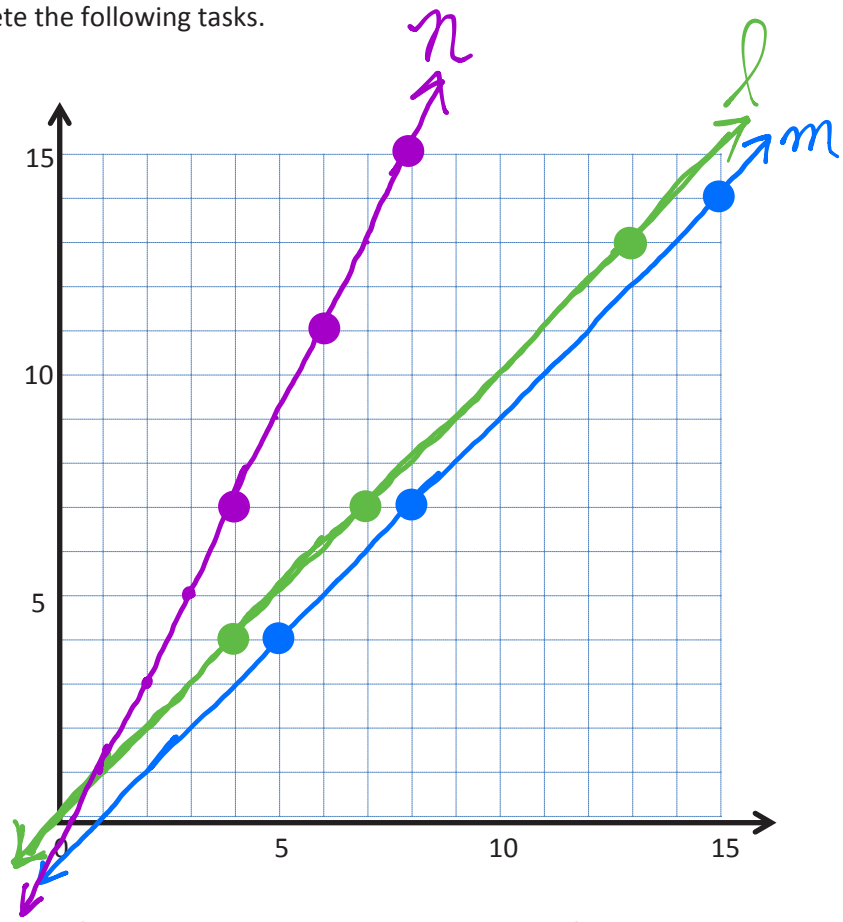
	x	y	(x, y)
A	4	4	(4,4)
B	7	7	(7,7)
C	13	13	(13,13)

line m: y is 1 less than x

	x	y	(x, y)
G	5	4	(5,4)
H	8	7	(8,7)
I	15	14	(15,14)

line n: y is 1 less than twice x

	x	y	(x, y)
S	4	7	(4,7)
T	8	15	(8,15)
U	6	11	(6,11)



b. Do any of these lines intersect? If yes, identify which ones, and give the coordinates of their intersection.

Line n intersects with Line ℓ at (1,1).

Line n would eventually intersect with Line m.

c. Are any of these lines parallel? If yes, identify which ones.

Lines ℓ and m are parallel.

d. Give the rule for another line that would be parallel to the lines you listed in (c).

(Answers will vary.)

y is 3 more than x.

Name _____ Date _____

1. Complete the table for the given rules.

Line a

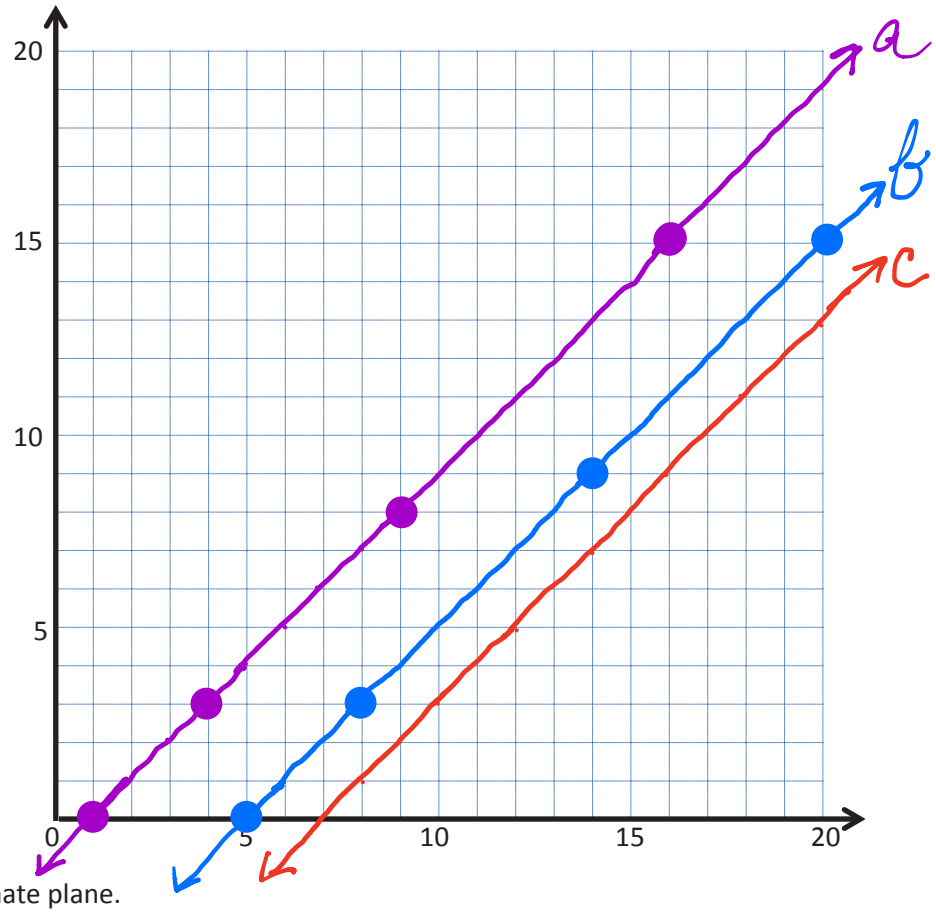
Rule: y is 1 less than x

x	y	(x, y)
1	0	(1,0)
4	3	(4,3)
9	8	(9,8)
16	15	(16,15)

Line b

Rule: y is 5 less than x

x	y	(x, y)
5	0	(5,0)
8	3	(8,3)
14	9	(14,9)
20	15	(20,15)



a. Construct each line on the coordinate plane.

b. Compare and contrast these lines.

(Answers will vary.)

The lines are parallel. Line b is "lower" than Line a because it use "5 less" rather than "1 less".

c. Based on the patterns you see, predict what line c, whose rule is y *is 7 less than* x, would look like. Draw your prediction on the plane above.

(Answers will vary.)

Line C would be parallel to Line b, but lower.

2. Complete the table for the given rules.

Line e

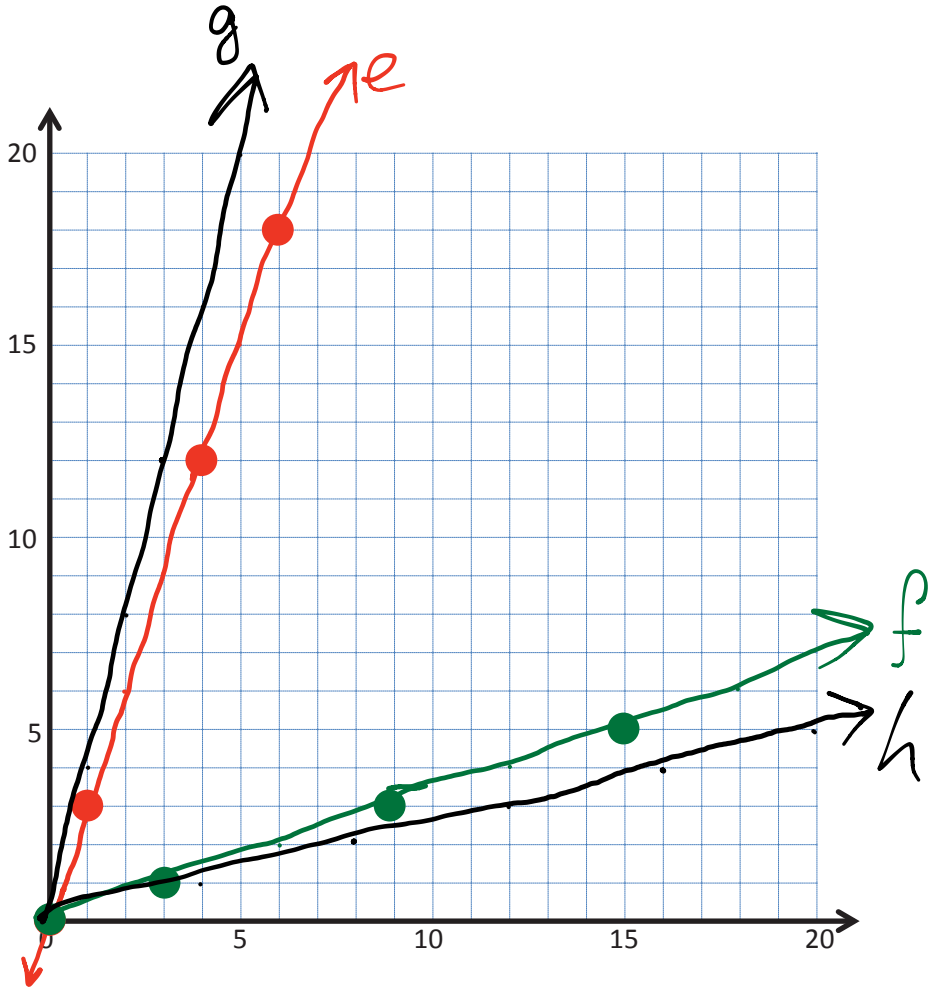
Rule: y is 3 times as much as x

x	y	(x, y)
0	0	(0,0)
1	3	(1,3)
4	12	(4,12)
6	18	(6,18)

Line f

Rule: y is a third as much as x

x	y	(x, y)
0	0	(0,0)
3	1	(3,1)
9	3	(9,3)
15	5	(15,5)



a. Construct each line on the coordinate plane.

b. Compare and contrast these lines.

(Answers will vary.)

Both lines go through (0,0). They are not parallel.

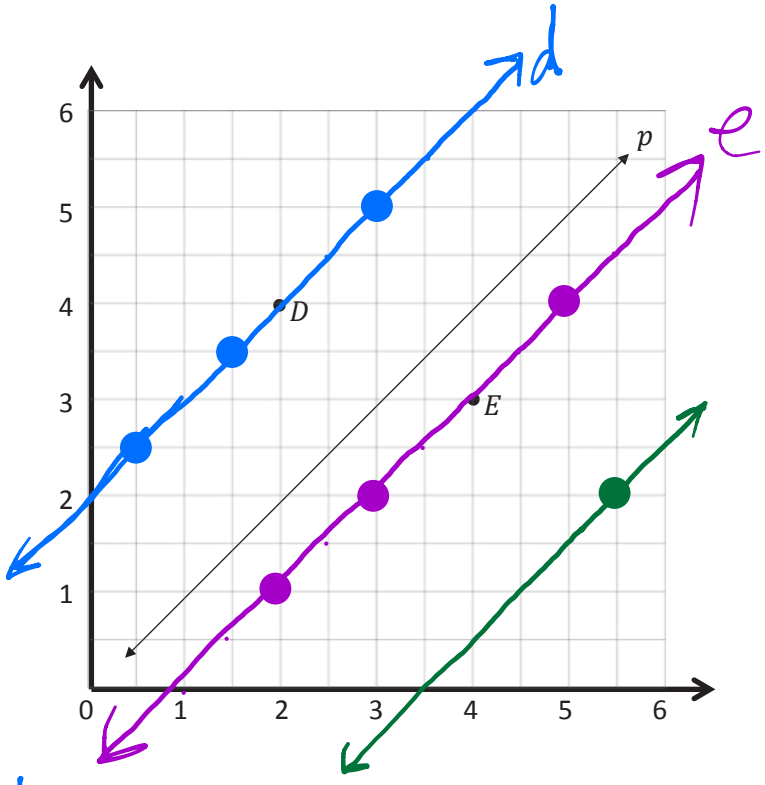
c. Based on the patterns you see, predict what line g, whose rule is *y is 4 times as much as x*, and line h, whose rule is *y is one-fourth as much as x*, would look like. Draw your prediction in the plane above.

(Answers will vary.)

Line g will be more steep than Line e.
Line h will be less steep than Line f.

Name _____ Date _____

1. Use the coordinate plane to complete the following tasks.



a. Line $\boldsymbol{p}$ represents the rule *x and y are equal*.

b. Construct a line, $\boldsymbol{d}$, that is parallel to line $\boldsymbol{p}$ and contains point D.

c. Name 3 coordinate pairs on line $\boldsymbol{d}$.

$(\frac{1}{2}, 2\frac{1}{2})$, $(1\frac{1}{2}, 3\frac{1}{2})$, $(3,5)$

d. Identify a rule to describe line $\boldsymbol{d}$.

The y coordinate is 2 more than the x coordinate.

e. Construct a line, $\boldsymbol{e}$, that is parallel to line $\boldsymbol{p}$ and contains point E.

f. Name 3 points on line $\boldsymbol{e}$.

(2,1), (3,2), (5,4)

g. Identify a rule to describe line $\boldsymbol{e}$.

The y coordinate is 1 less than the x coordinate.

h. Compare and contrast lines $\boldsymbol{d}$ and $\boldsymbol{e}$ in terms of their relationship to line $\boldsymbol{p}$.

(Answers will vary.) d is above p, while e is below.

2. Write a rule for a fourth line that would be parallel to those above and that would contain the point $(5\frac{1}{2}, 2)$. Explain how you know.

(Answers will vary.)

The y is $3\frac{1}{2}$ less than x. This is correct because $5\frac{1}{2} - 3\frac{1}{2} = 2$.

3. Use the coordinate plane below to complete the following tasks.

   a. Line $\boldsymbol{p}$ represents the rule *x and y are equal*.

   b. Construct a line, $\boldsymbol{v}$, that contains the origin and point V.

   c. Name 3 points on line $\boldsymbol{v}$.

(1,2), (3,6), (5,10)

   d. Identify a rule to describe line $\boldsymbol{v}$.

y is 2 times x.

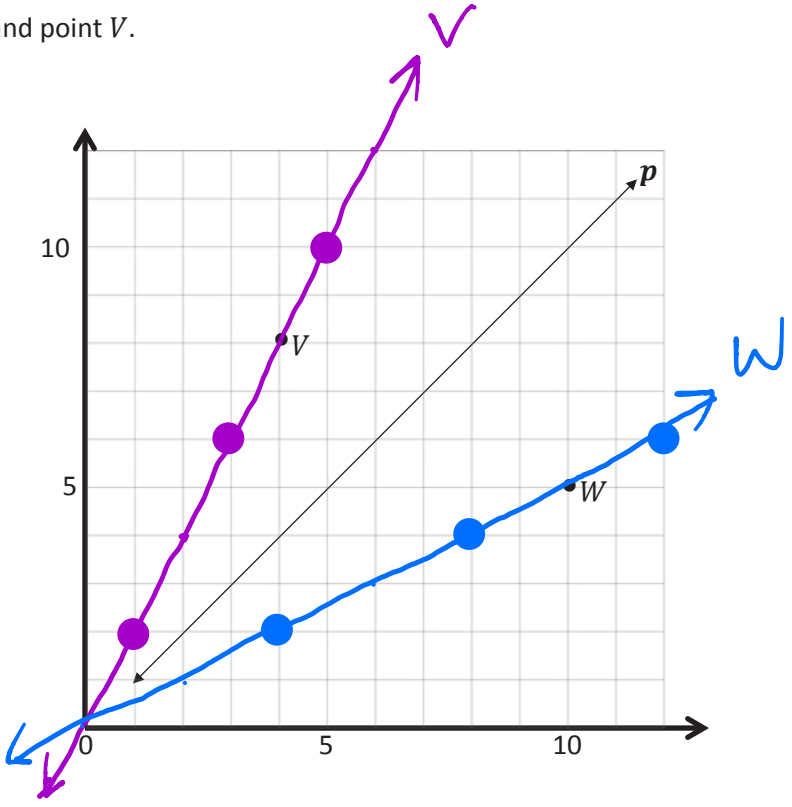
   e. Construct a line, $\boldsymbol{w}$, that contains the origin and point W.

   f. Name 3 points on line $\boldsymbol{w}$.

(4,2), (8,4), (12,6)

   g. Identify a rule to describe line $\boldsymbol{w}$.

y is $\frac{1}{2}$ as much as x.



   h. Compare and contrast lines $\boldsymbol{v}$ and $\boldsymbol{w}$ in terms of their relationship to line $\boldsymbol{p}$.

v is steeper than Line p. Line w is less steep than Line p.

   i. What patterns do you see in lines that are generated by multiplication rules?

Multiplying by a number greater than 1 creates a steep line. Multiplying by a fraction less than 1 creates a non-steep line.

Name _____ Date _____

1. Complete the tables for the given rules.

Line ℓ

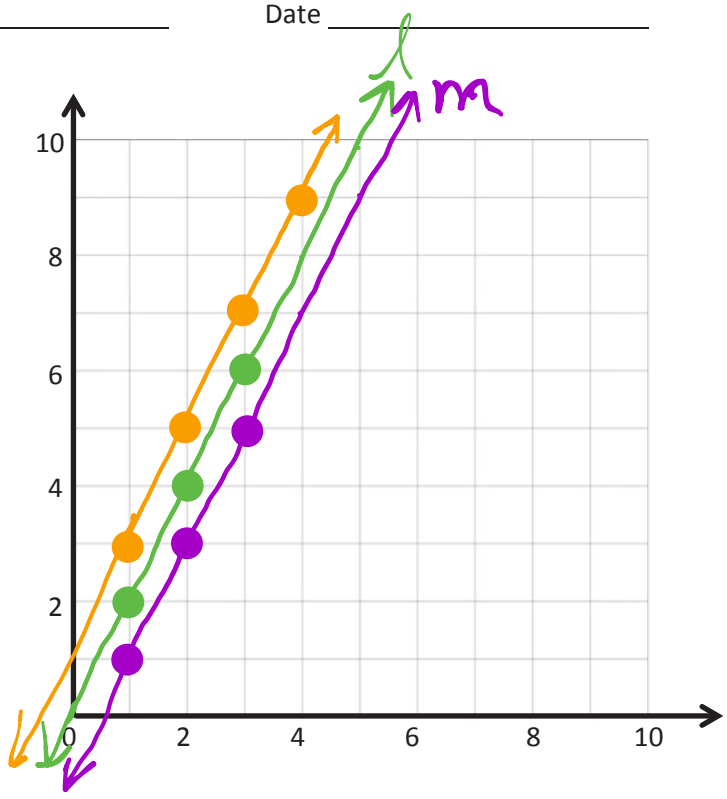
Rule: *Double* x

x	y	(x, y)
1	2	(1, 2)
2	4	(2, 4)
3	6	(3, 6)

Line m

Rule: *Double* x, *then subtract 1*

x	y	(x, y)
1	1	(1, 1)
2	3	(2, 3)
3	5	(3, 5)



a. Draw each line on the coordinate plane above.

b. Compare and contrast these lines.

(Answers will vary.)

They are parallel, but m is lower than l because we subtracted by 1.

c. Based on the patterns you see, predict what the line for the rule *double x, then add 1* would look like. Draw your prediction on the plane above.

It would be parallel to l, but 1 higher.

2. Circle the point(s) that the line for the rule *multiply x by* $\frac{1}{2}$*, then add 1* would contain.

$(0, \frac{1}{2})$ $(2, 1\frac{1}{4})$ (2, 2) $(3, \frac{1}{2})$

a. Explain how you know.

$2 \times \frac{1}{2} + 1 = 1 + 1 = 2$, so (2,2) works.

b. Give two other points that fall on this line.

(6, 4) (12, 7)

3. Complete the tables for the given rules.

Line ℓ

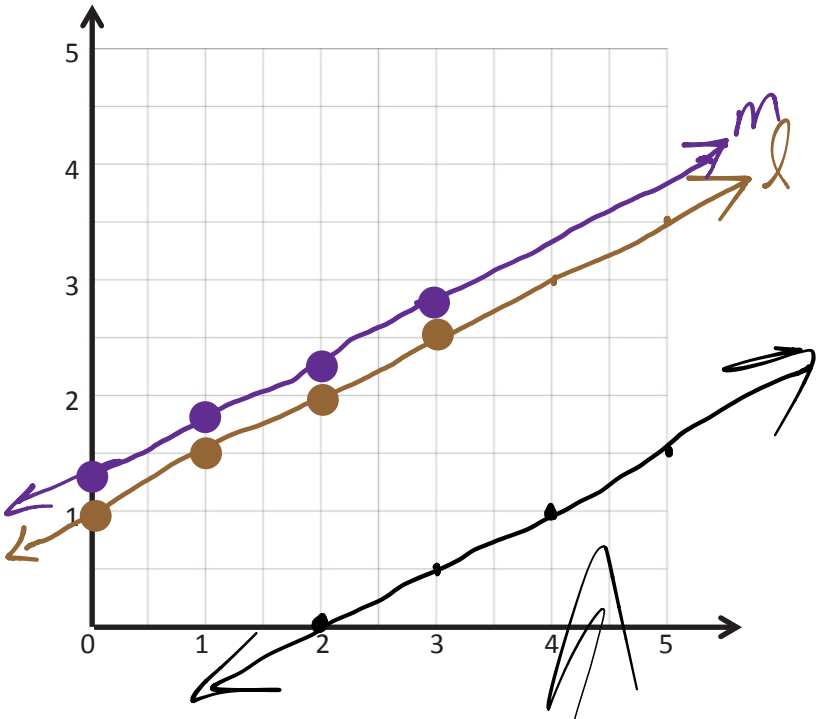
Rule: *Halve x, then add 1*

x	y	(x, y)
0	1	(0, 1)
1	$1\frac{1}{2}$	$(1, 1\frac{1}{2})$
2	2	(2, 2)
3	$2\frac{1}{2}$	$(3, 2\frac{1}{2})$

Line m

Rule: *Halve x, then add* $1\frac{1}{4}$

x	y	(x, y)
0	$1\frac{1}{4}$	$(0, 1\frac{1}{4})$
1	$1\frac{3}{4}$	$(1, 1\frac{3}{4})$
2	$2\frac{1}{4}$	$(2, 2\frac{1}{4})$
3	$2\frac{3}{4}$	$(3, 2\frac{3}{4})$



a. Draw each line on the coordinate plane above.

b. Compare and contrast these lines.

(Answers will vary.)

The lines are parallel.

c. Based on the patterns you see, predict what the line for the rule *halve x, then subtract 1* would look like. Draw your prediction on the plane above.

It would be parallel to l, but below it.

4. Circle the point(s) that the line for the rule *multiply x by* $\frac{3}{4}$, *then subtract* $\frac{1}{2}$ would contain.

$(1, \frac{1}{4})$ $(2, \frac{1}{4})$ $(3, 1\frac{3}{4})$ (3, 1)

a. Explain how you know.

$1 \times \frac{3}{4} - \frac{1}{2} = \frac{3}{4} - \frac{1}{2} = \frac{1}{4}$ and $3 \times \frac{3}{4} - \frac{1}{2} = \frac{9}{4} - \frac{2}{4} = \frac{7}{4} = 1\frac{3}{4}$

b. Give two other points that fall on this line.

$(4, 2\frac{1}{2})$ and $(8, 5\frac{1}{2})$

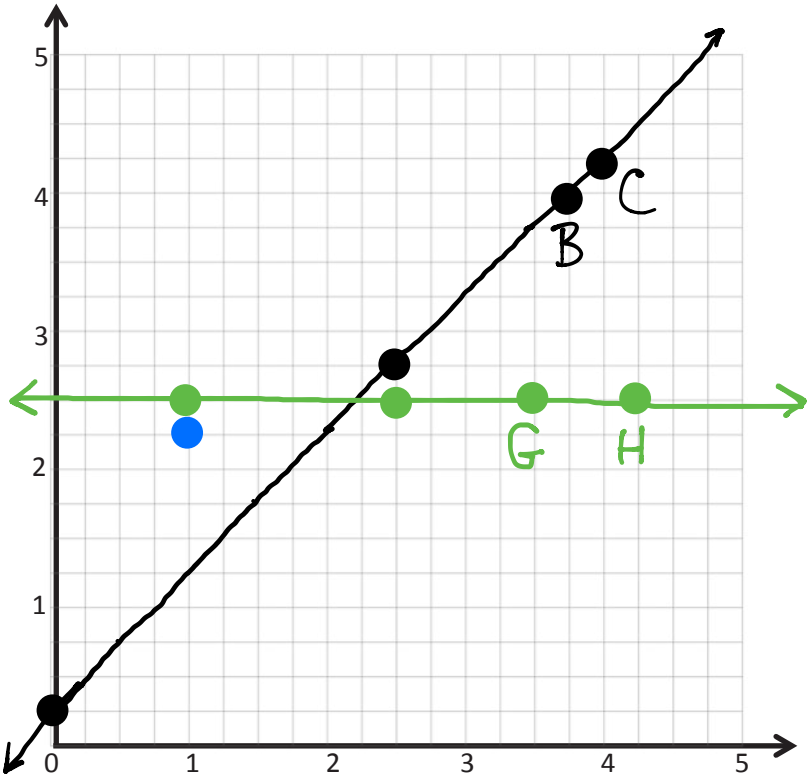
Name _____ Date _____

1. Write a rule for the line that contains the points $(0, \frac{1}{4})$ and $(2\frac{1}{2}, 2\frac{3}{4})$.

y is $\frac{1}{4}$ more than x.

a. Identify 2 more points on this line. Draw the line on the grid below.

Point	x	y	(x, y)
B	4	$4\frac{1}{4}$	$(4, 4\frac{1}{4})$
C	$3\frac{3}{4}$	4	$(3\frac{3}{4}, 4)$



b. Write a rule for a line that is parallel to $\overleftrightarrow{BC}$ and goes through point $(1, 2\frac{1}{4})$.

y is $1\frac{1}{4}$ more than x.

2. Give the rule for the line that contains the points $(1, 2\frac{1}{2})$ and $(2\frac{1}{2}, 2\frac{1}{2})$.

y is always $2\frac{1}{2}$.

a. Identify 2 more points on this line. Draw the line on the grid above.

(Answers will vary.)

Point	x	y	(x, y)
G	$3\frac{1}{2}$	$2\frac{1}{2}$	$(3\frac{1}{2}, 2\frac{1}{2})$
H	$4\frac{1}{4}$	$2\frac{1}{2}$	$(4\frac{1}{4}, 2\frac{1}{2})$

b. Write a rule for a line that is parallel to $\overleftrightarrow{GH}$.

(Answers will vary.)

y is always 1.

3. Give the rule for a line that contains the point $(\frac{3}{4}, 1\frac{1}{2})$, using the operation or description below. Then, name 2 other points that would fall on each line.

a. Addition: $y = x + \frac{3}{4}$

Point	x	y	(x, y)
T	2	$2\frac{3}{4}$	$(2, 2\frac{3}{4})$
U	$3\frac{1}{4}$	4	$(3\frac{1}{4}, 4)$

b. A line parallel to the x-axis: y is always $1\frac{1}{2}$

Point	x	y	(x, y)
G	2	$1\frac{1}{2}$	$(2, 1\frac{1}{2})$
H	4	$1\frac{1}{2}$	$(4, 1\frac{1}{2})$

c. Multiplication: $y = x$ times 2

Point	x	y	(x, y)
A	1	2	$(1, 2)$
B	3	6	$(3, 6)$

d. A line parallel to the y-axis: x is always $\frac{3}{4}$

Point	x	y	(x, y)
V	$\frac{3}{4}$	2	$(\frac{3}{4}, 2)$
W	$\frac{3}{4}$	5	$(\frac{3}{4}, 5)$

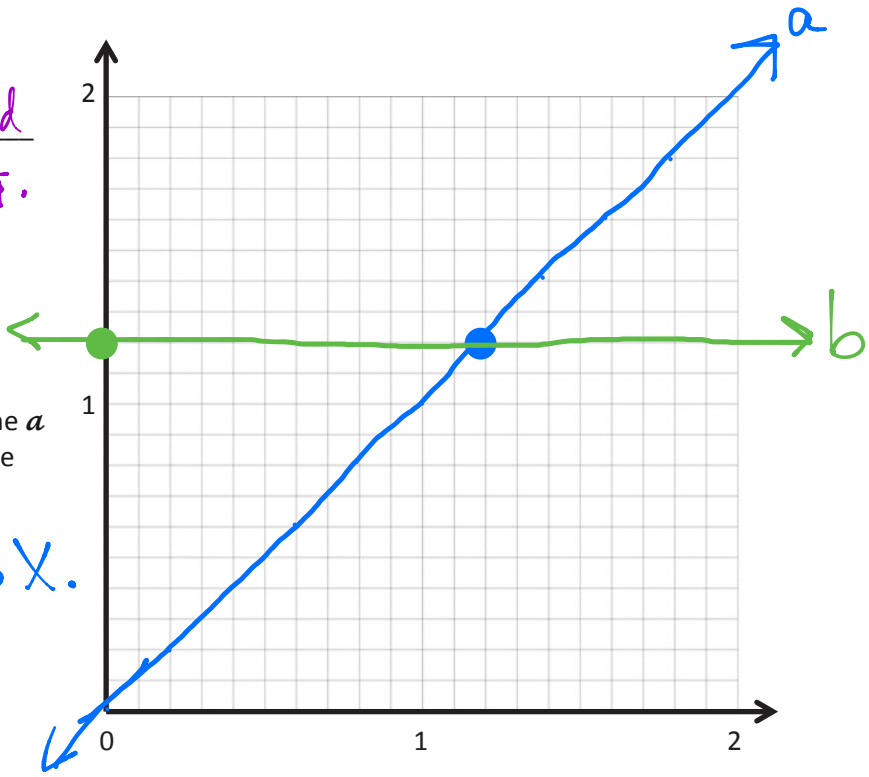
e. Multiplication with addition: x times 1 and add $\frac{3}{4}$.

Point	x	y	(x, y)
R	2	$2\frac{3}{4}$	$(2, 2\frac{3}{4})$
S	$3\frac{1}{4}$	4	$(3\frac{1}{4}, 4)$

4. On the grid, two lines intersect at (1.2, 1.2). If line a passes through the origin, and line b contains the point (1.2, 0), write a rule for line a and line b.

Line a: y is the same as x.

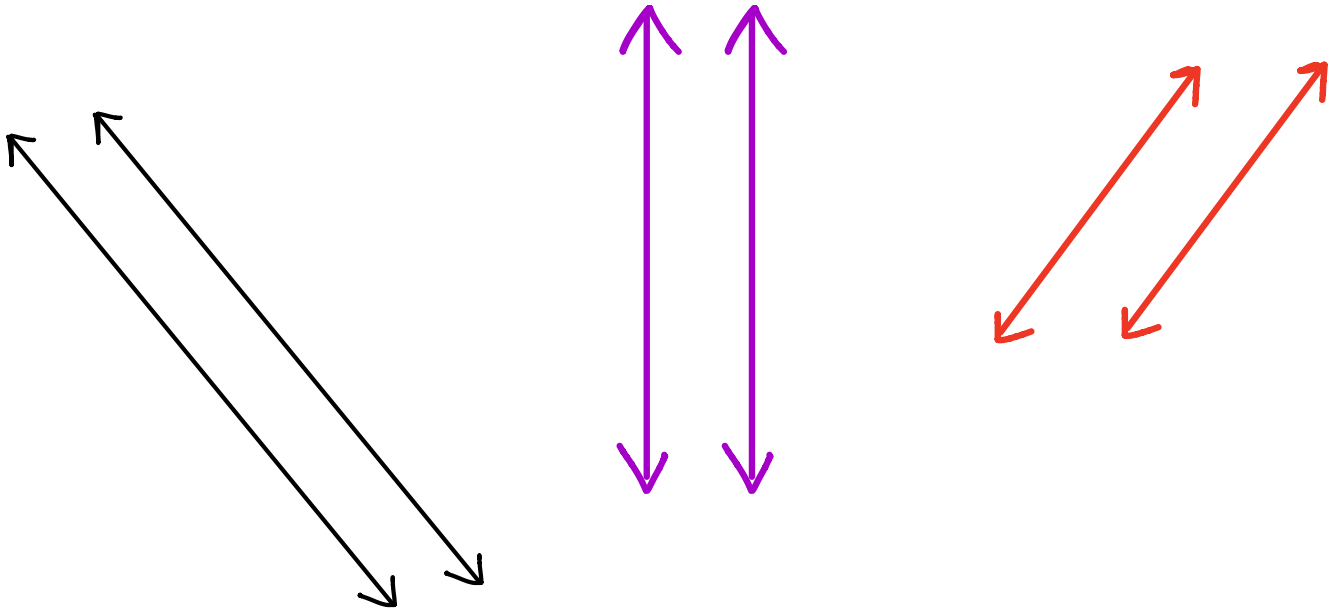
Line b: y is always 1.2.



Name _____ Date _____

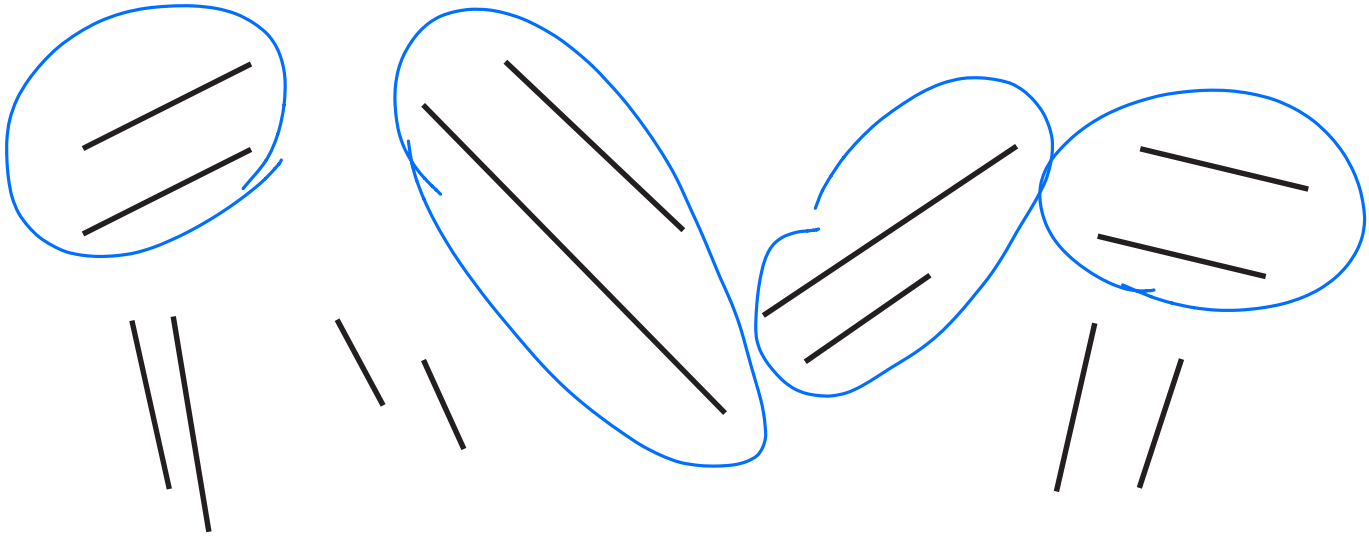
1. Use your right angle template and straightedge to draw at least three sets of parallel lines in the space below.

(Answers will vary.)

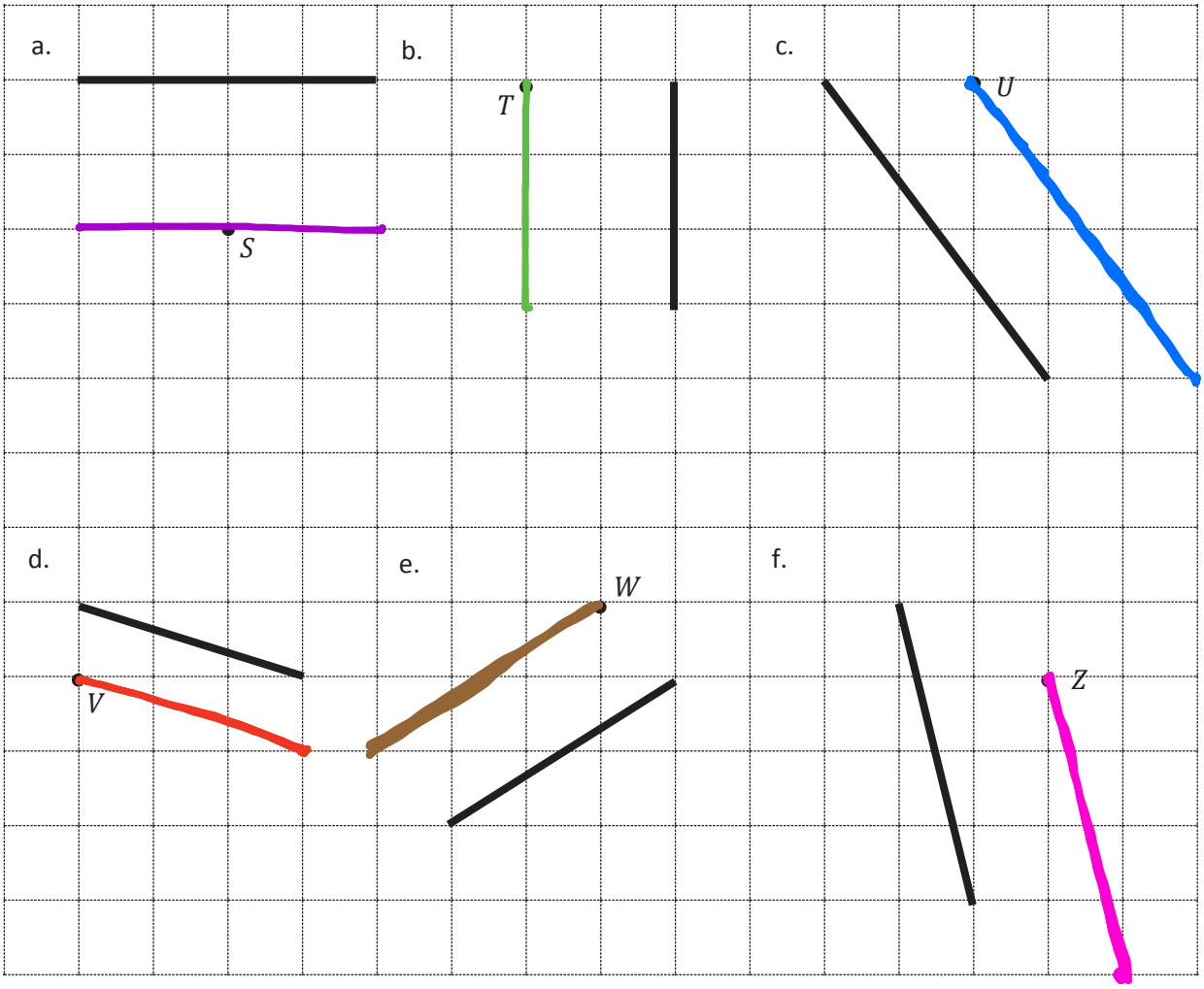


NOTE: Since there is no grid, we will use estimation

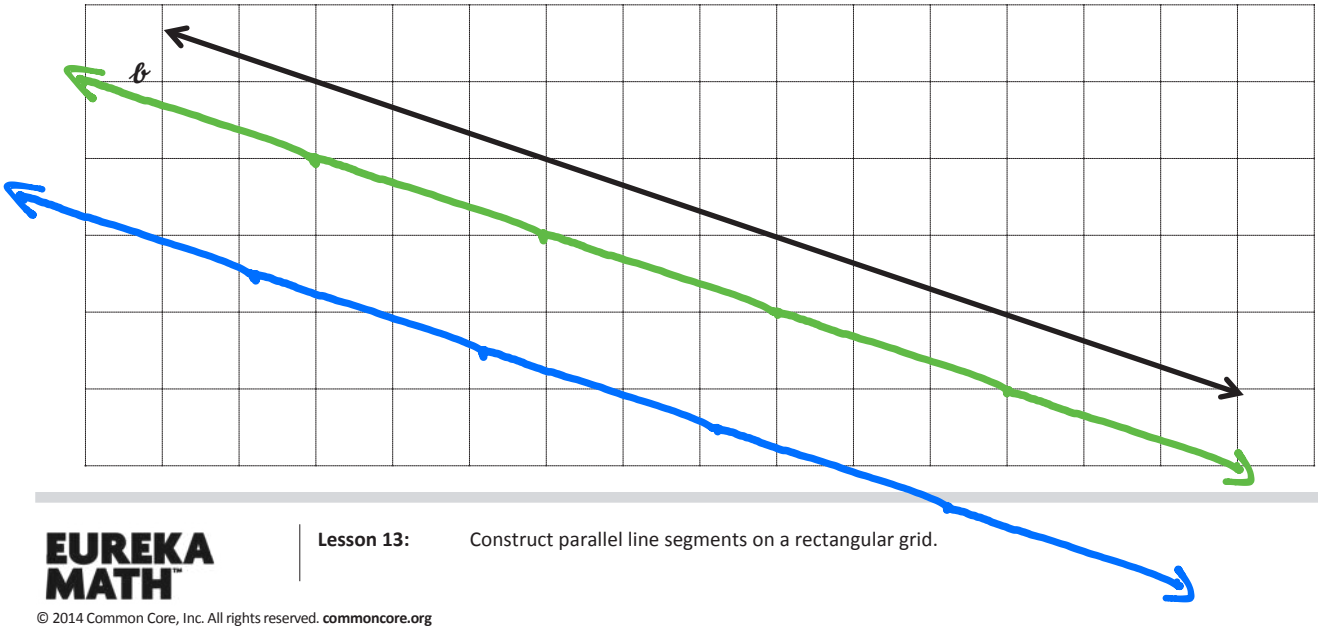
2. Circle the segments that are parallel.



3. Use your straightedge to draw a segment parallel to each segment through the given point.

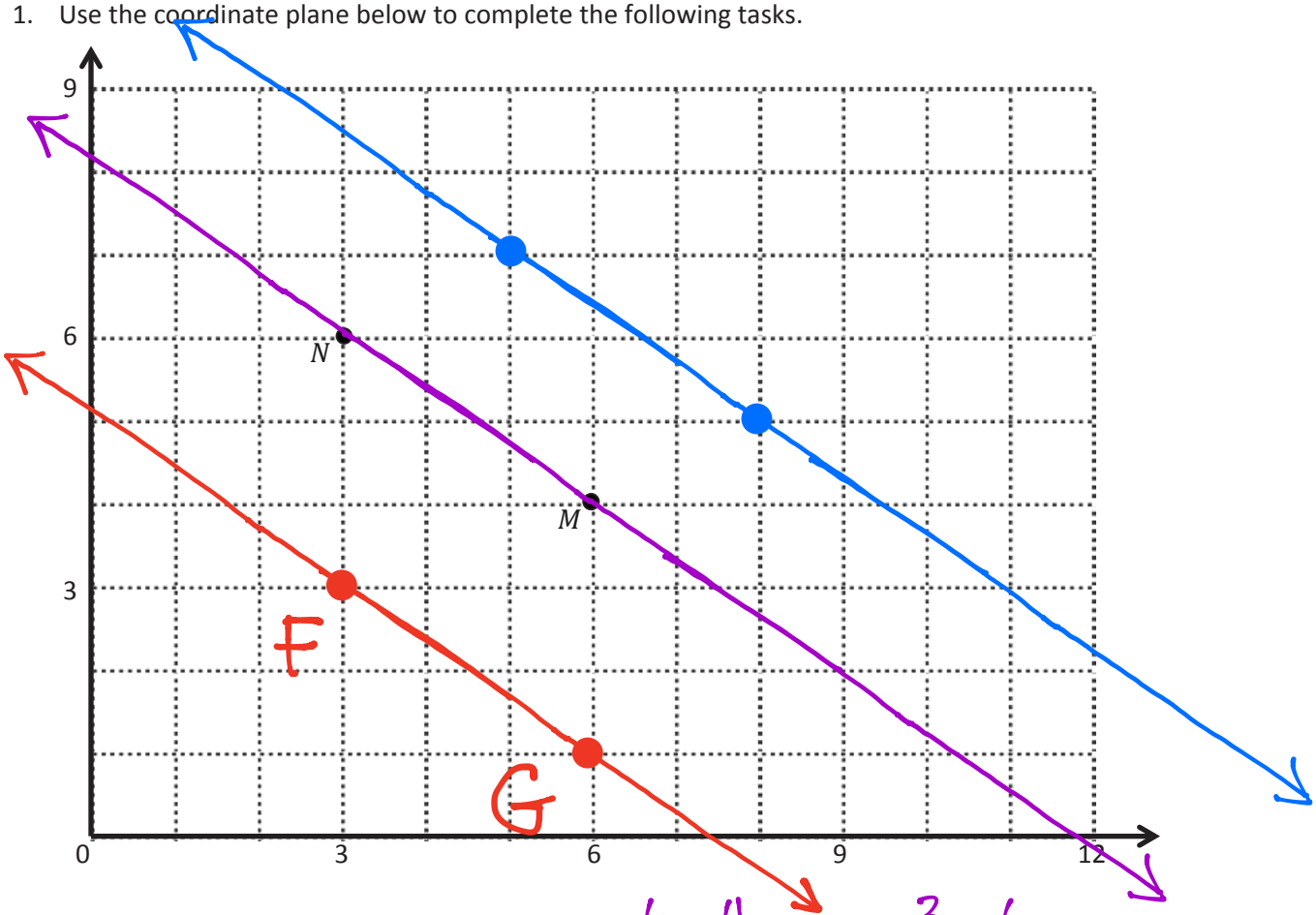


4. Draw 2 different lines parallel to line $\mathscr{b}$.



Name _____ Date _____

1. Use the coordinate plane below to complete the following tasks.



a. Identify the locations of M and N. M: (6, 4) N: (3, 6)

b. Draw $\overleftrightarrow{MN}$.

c. Plot the following coordinate pairs on the plane.

J: (5, 7) K: (8, 5)

d. Draw $\overleftrightarrow{JK}$.

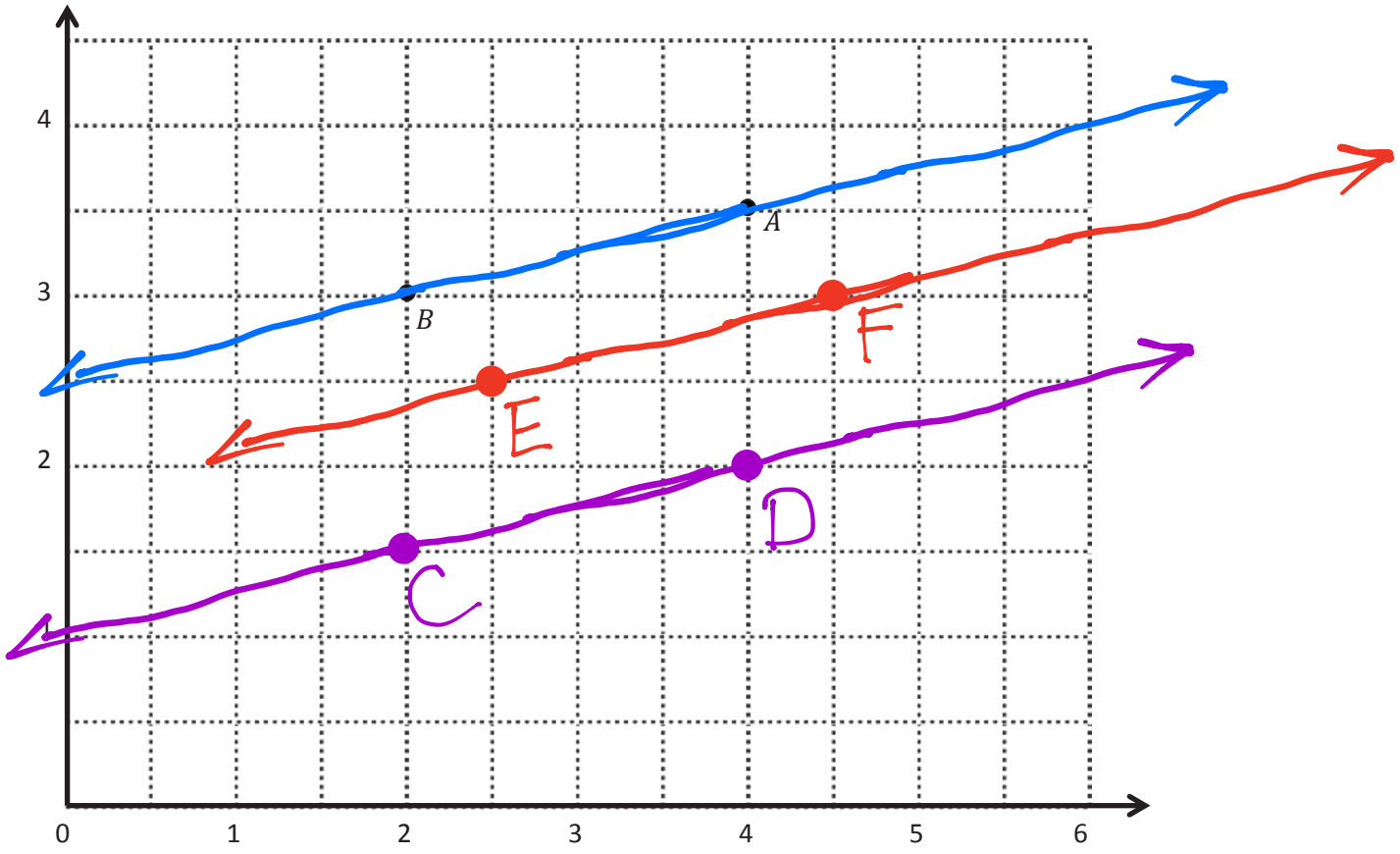
e. Circle the relationship between $\overleftrightarrow{MN}$ and $\overleftrightarrow{JK}$. $\overleftrightarrow{MN} \perp \overleftrightarrow{JK}$ $\overleftrightarrow{MN} \parallel \overleftrightarrow{JK}$

f. Give the coordinates of a pair of points, F and G, such that $\overleftrightarrow{FG} \parallel \overleftrightarrow{MN}$.

(Answers will vary.) F: (3, 3) G: (6, 1)

g. Draw $\overleftrightarrow{FG}$.

2. Use the coordinate plane below to complete the following tasks.



a. Identify the locations of A and B. A: (4, $3\frac{1}{2}$) B: (2, 3)

b. Draw $\overleftrightarrow{AB}$.

c. Generate coordinate pairs for C and D, such that $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$.

(Answers will vary.) C: (2, $1\frac{1}{2}$) D: (4, 2)

d. Draw $\overleftrightarrow{CD}$.

e. Explain the pattern you used when generating coordinate pairs for C and D. I lowered A and B by 3 units.

f. Give the coordinates of a point, F, such that $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$.

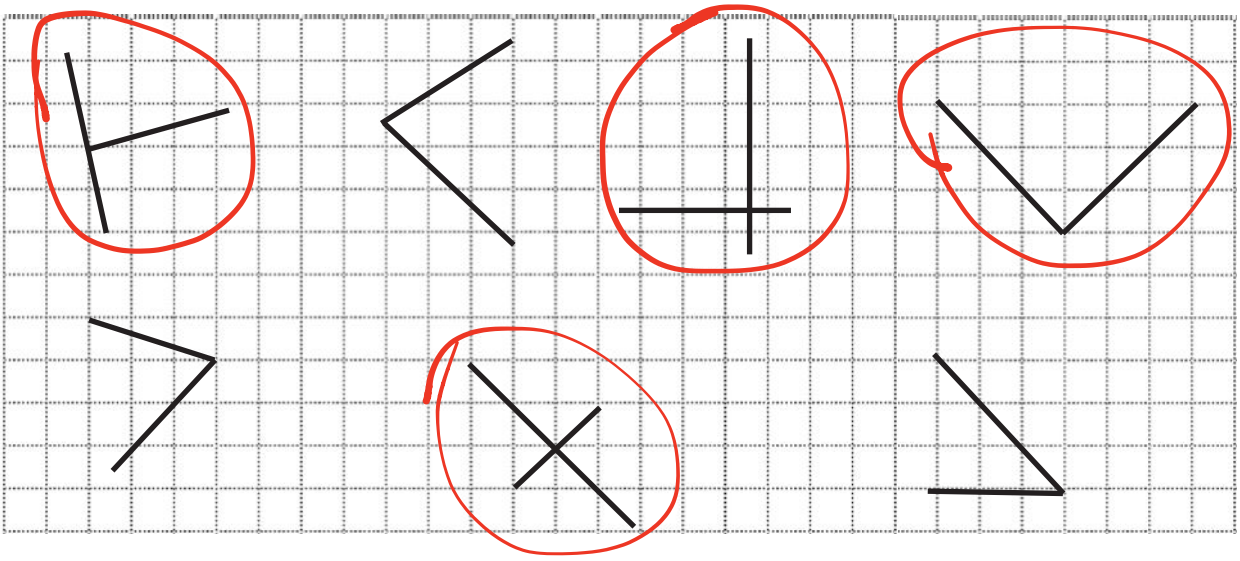
E: $(2\frac{1}{2}, 2\frac{1}{2})$ F: ($4\frac{1}{2}$, 3)

g. Explain how you chose the coordinates for F.

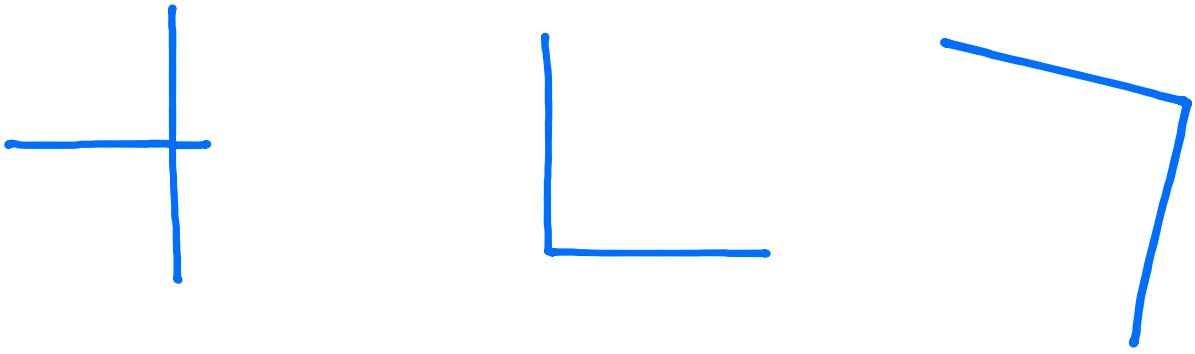
(Answers will vary.) I noticed E was diagonal to B, so I made F diagonal to A.

Name _____ Date _____

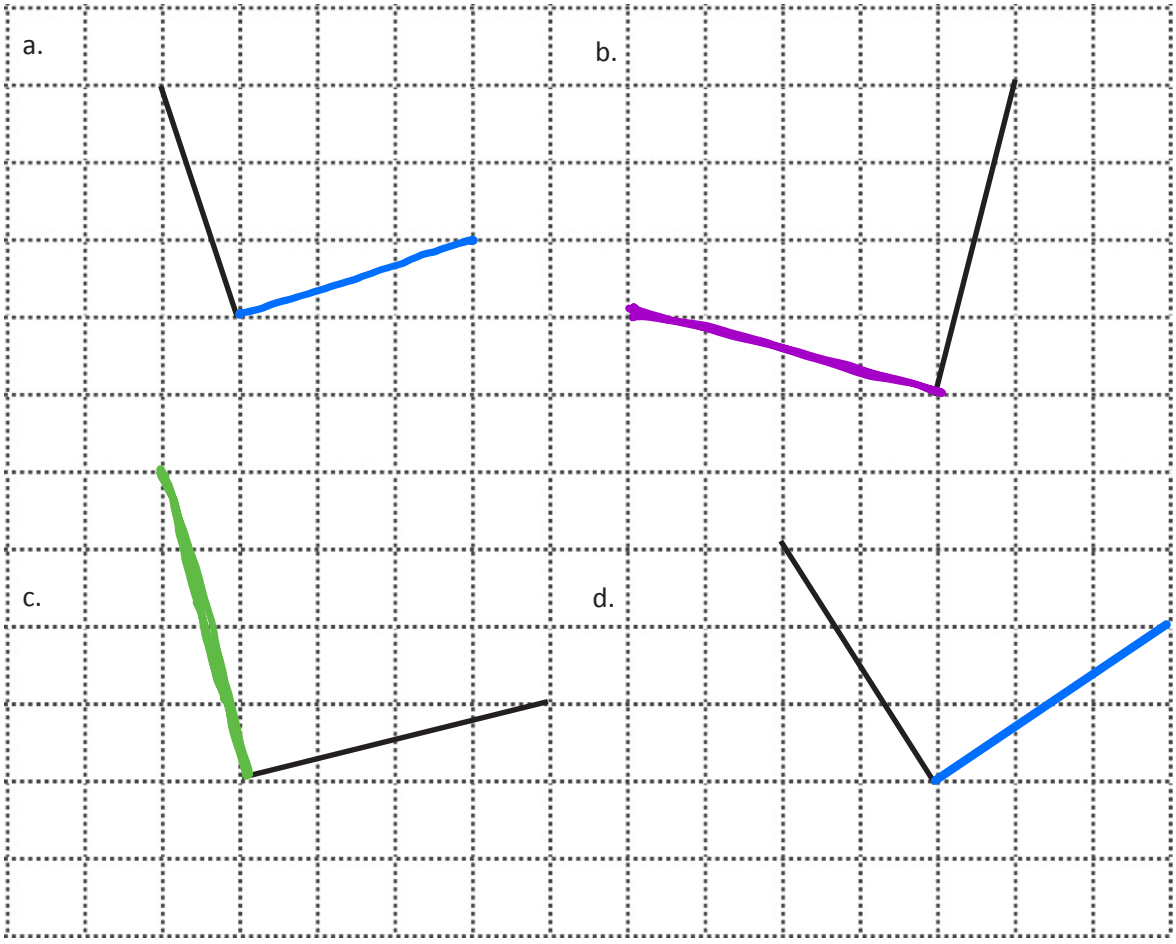
1. Circle the pairs of segments that are perpendicular.



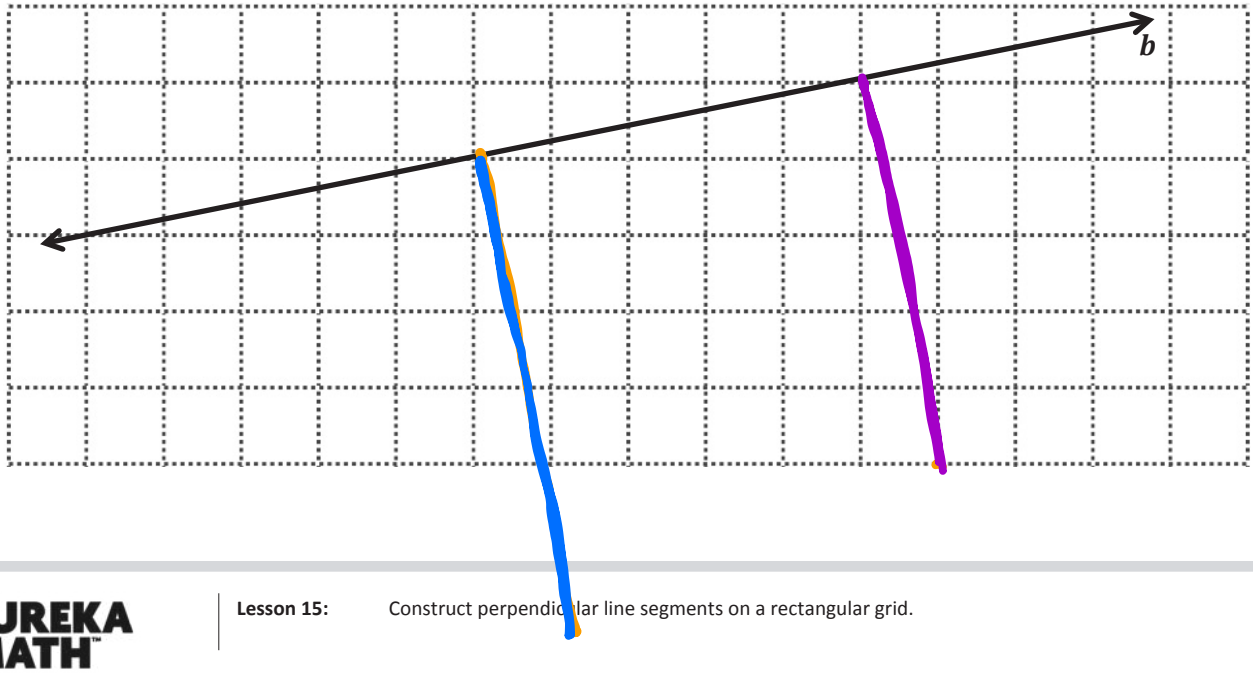
2. In the space below, use your right triangle templates to draw at least 3 different sets of perpendicular lines.



3. Draw a segment perpendicular to each given segment. Show your thinking by sketching triangles as needed.



4. Draw 2 different lines perpendicular to line b.

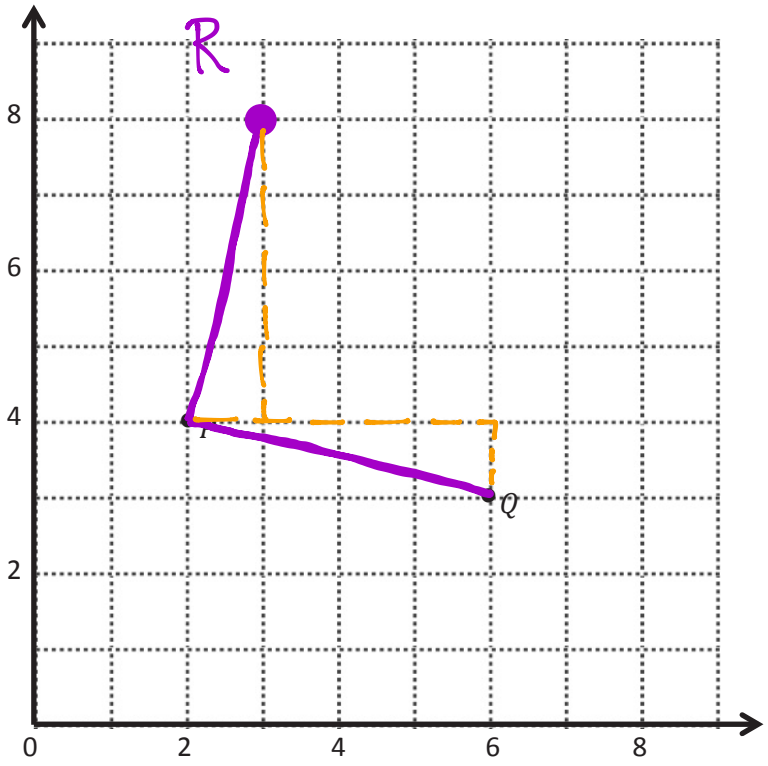


Name _____ Date _____

1. Use the coordinate plane below to complete the following tasks.

   a. Draw $\overline{PQ}$.
   b. Plot point R (3, 8).
   c. Draw $\overline{PR}$.
   d. Explain how you know $\angle RPQ$ is a right angle without measuring it.

Since the two acute angles of the reference triangles are adjacent, we know it is 90°.



   e. Compare the coordinates of points P and Q. What is the difference of the x-coordinates? The y-coordinates?

x diff = 4
y diff = 1

   f. Compare the coordinates of points P and R. What is the difference of the x-coordinates? The y-coordinates?

x diff = 1
y diff = 4

   g. What is the relationship of the differences you found in (e) and (f) to the triangles of which these two segments are a part?

The difference of the x coordinates of P and Q are the same as the difference of the y coordinates of P and R.

The difference of the y coordinates of P and Q are the same as the difference of the x coordinates of P and R.

The differences switched.

2. Use the coordinate plane below to complete the following tasks.

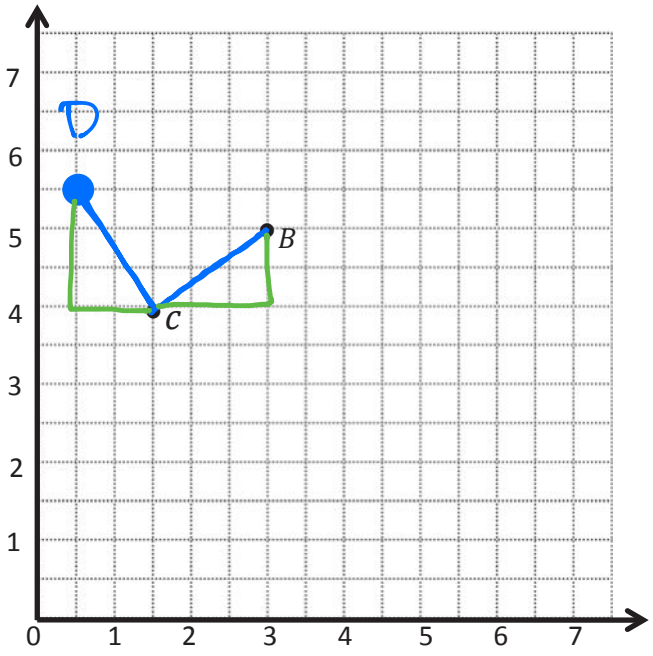
a. Draw $\overline{CB}$.

b. Plot point D $(\frac{1}{2}, 5\frac{1}{2})$.

c. Draw $\overline{CD}$.

d. Explain how you know $\angle DCB$ is a right angle without measuring it.

We know the two acute angles add up to 90°, so ∠DCB must also be 90°.



e. Compare the coordinates of points C and B. What is the difference of the x-coordinates? The y-coordinates?

x diff = 1 ½
y diff = 1

f. Compare the coordinates of points C and D. What is the difference of the x-coordinates? The y-coordinates?

x diff = 1
y diff = 1 ½

g. What is the relationship of the differences you found in (e) and (f) to the triangles of which these two segments are a part?

the differences of the x coordinates and the y coordinates flipped.

3. $\overleftrightarrow{ST}$ contains the following points. S: (2, 3) T: (9, 6)

Give the coordinates of a pair of points, U and V, such that $\overleftrightarrow{ST} \perp \overleftrightarrow{UV}$.

U: (6, 2) V: (3, 9)

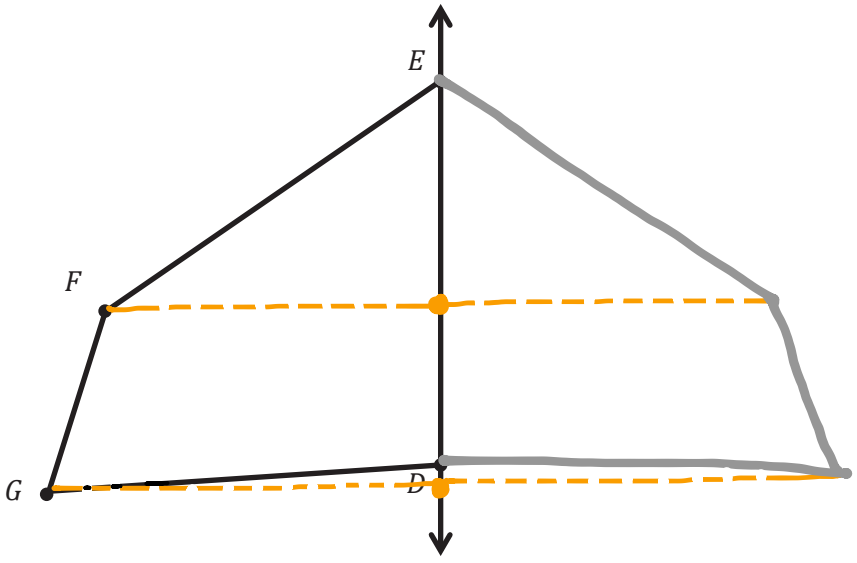
x diff = 7
y diff = 3

Answers will vary

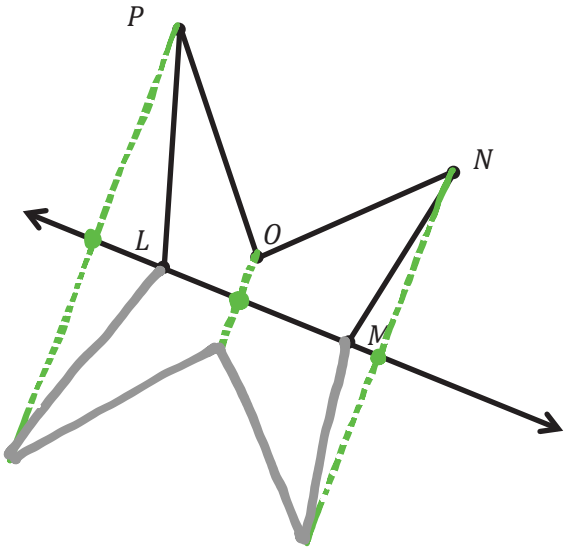
x diff = 3
y diff = 7

Name _____ Date _____

1. Draw to create a figure that is symmetric about $\overleftrightarrow{DE}$.



2. Draw to create a figure that is symmetric about $\overleftrightarrow{LM}$.



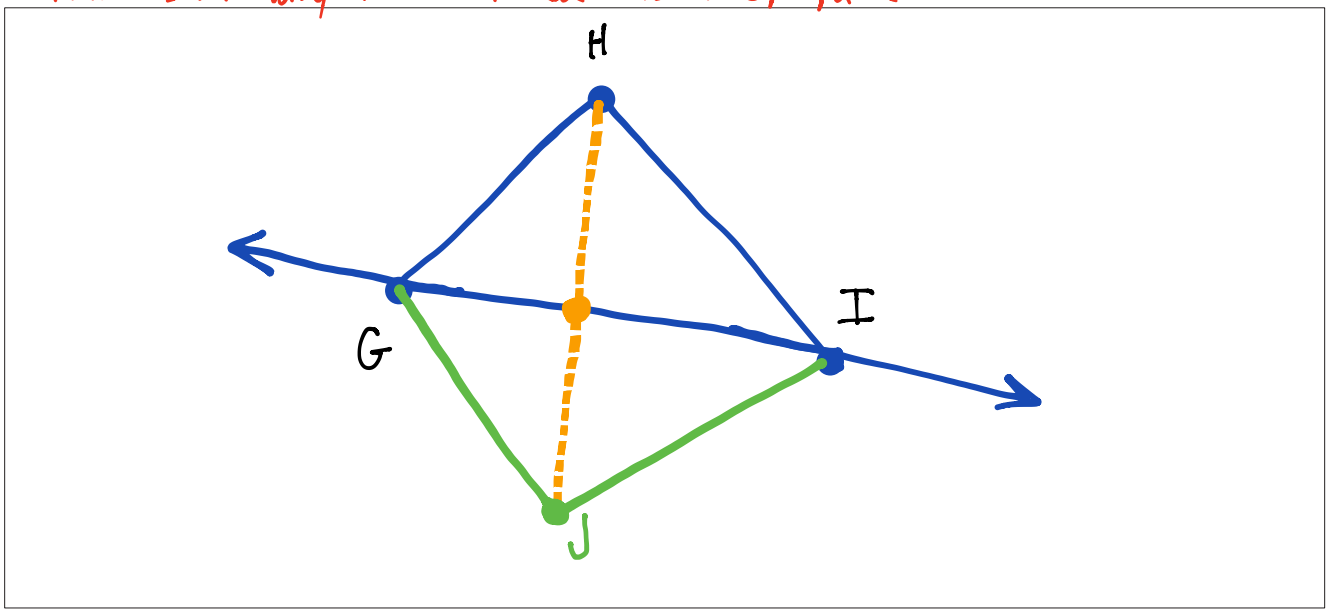
3. Complete the following construction in the space below.

   a. Plot 3 non-collinear points, G, H, and I.

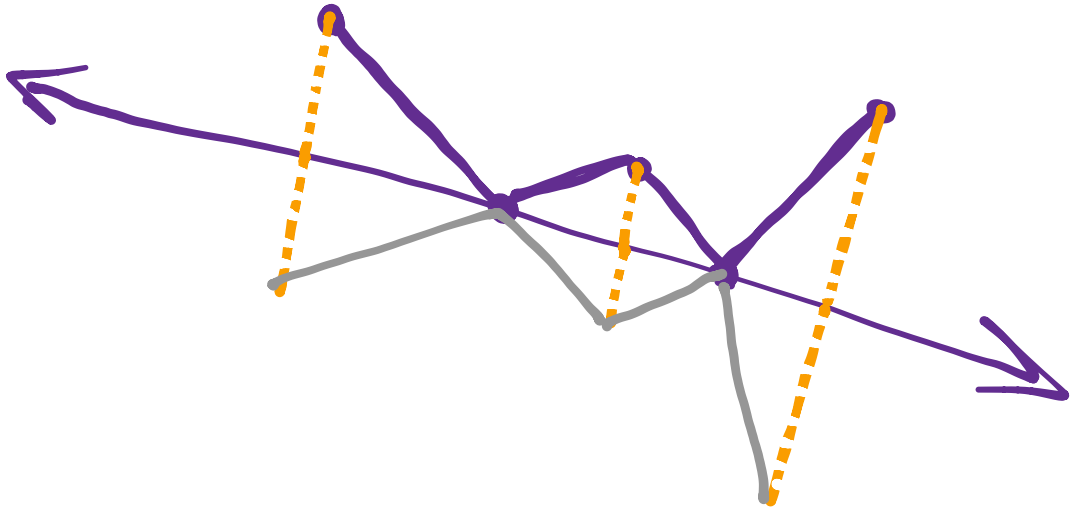
   b. Draw $\overline{GH}$, $\overline{HI}$, and $\overleftrightarrow{IG}$.

   c. Plot point J, and draw the remaining sides, such that quadrilateral $GHIJ$ is symmetric about $\overleftrightarrow{IG}$.

Answers will vary based on locations of G, H, and I.



4. In the space below, use your tools to draw a symmetric figure about a line. Answers will vary.



Name _____ Date _____

1. Use the plane to the right to complete the following tasks.

   a. Draw a line s whose rule is x *is always 5*.

   b. Plot the points from Table A on the grid in order. Then, draw line segments to connect the points in order.

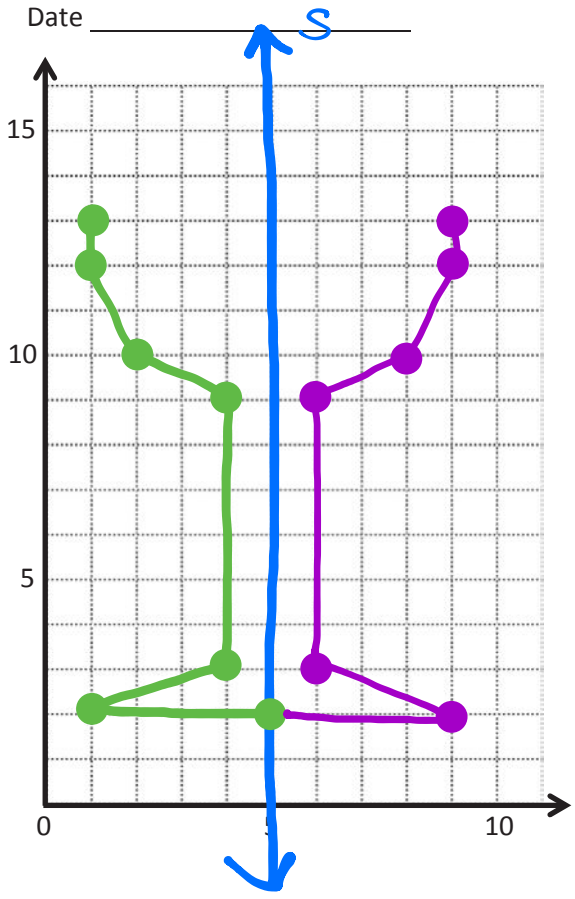


Table A

(x, y)
(1, 13)
(1, 12)
(2, 10)
(4, 9)
(4, 3)
(1, 2)
(5, 2)

Table B

(x, y)
(9,13)
(9, 12)
(8, 10)
(6,9)
(6,3)
(9,2)
(5,2)

   c. Complete the drawing to create a figure that is symmetric about line s. For each point in Table A, record the symmetric point on the other side of s.

   d. Compare the y-coordinates in Table A with those in Table B. What do you notice?

The y coordinates of Table A are the same as the y coordinates of Table B.

   e. Compare the x-coordinates in Table A with those in Table B. What do you notice?

The difference of the x coordinate of Table A and 5 will be the same as the difference of the x coordinate of Table B and 5. In other words the X coordinates of Table A and Table B are always the same distance from the line of symmetry.

2. Use the plane to the right to complete the following tasks.

   a. Draw a line $\boldsymbol{p}$ whose rule is, *y is equal to x*.

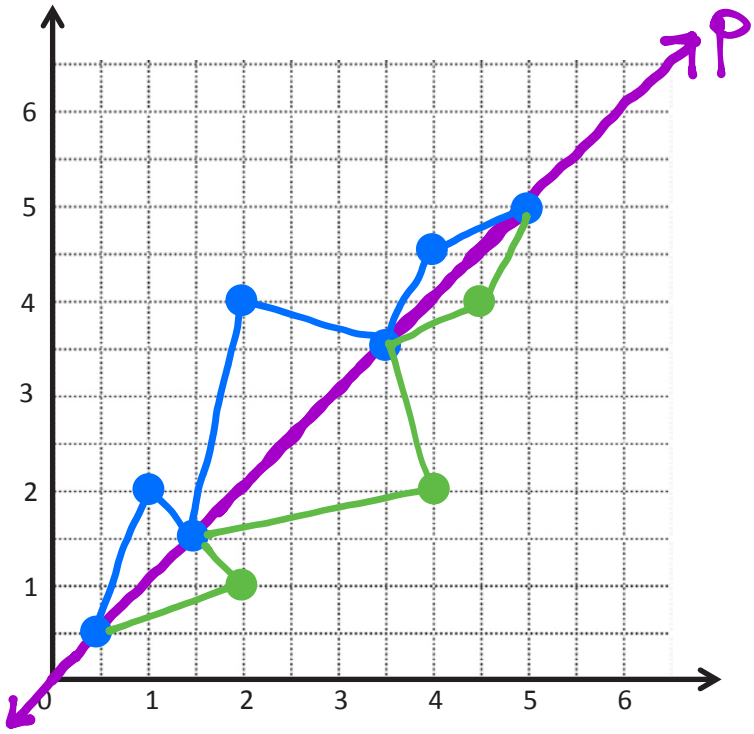
   b. Plot the points from Table A on the grid in order. Then, draw line segments to connect the points.

Table A

(x, y)
$(\frac{1}{2}, \frac{1}{2})$
(1, 2)
$(1\frac{1}{2}, 1\frac{1}{2})$
(2, 4)
$(3\frac{1}{2}, 3\frac{1}{2})$
$(4, 4\frac{1}{2})$
(5, 5)

Table B

(x, y)
$(\frac{1}{2}, \frac{1}{2})$
(2, 1)
$(1\frac{1}{2}, 1\frac{1}{2})$
(4, 2)
$(3\frac{1}{2}, 3\frac{1}{2})$
$(4\frac{1}{2}, 4)$
(5, 5)



   c. Complete the drawing to create a figure that is symmetric about line $\boldsymbol{p}$. For each point in Table A, record the symmetric point on the other side of the line $\boldsymbol{p}$ in Table B.

   d. Compare the y-coordinates in Table A with those in Table B. What do you notice?

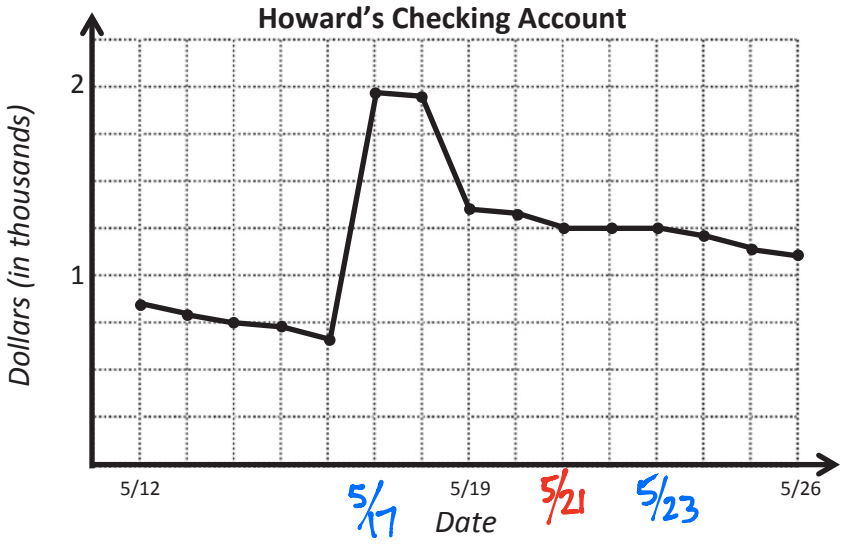
The y-coordinates of Table A become the x-coordinates of Table B.

   e. Compare the x-coordinates in Table A with those in Table B. What do you notice?

The x-coordinates of Table A become the y-coordinates of Table B.

Name _____ Date _____

1. The line graph below tracks the balance of Howard's checking account, at the end of each day, between May 12 and May 26. Use the information in the graph to answer the questions that follow.



a. About how much money does Howard have in his checking account on May 21?

About 1.25 thousand dollars. ($1250)

b. If Howard spends $250 from his checking account on May 26, about how much money will he have left in his account?

About $875.

$$\begin{array}{r} {}^{0}\cancel{1}{}^{1}25 \\ -\ 250 \\ \hline 875 \end{array}$$

c. Explain what happened with Howard's money between May 21 and May 23.

the amount stayed the same.

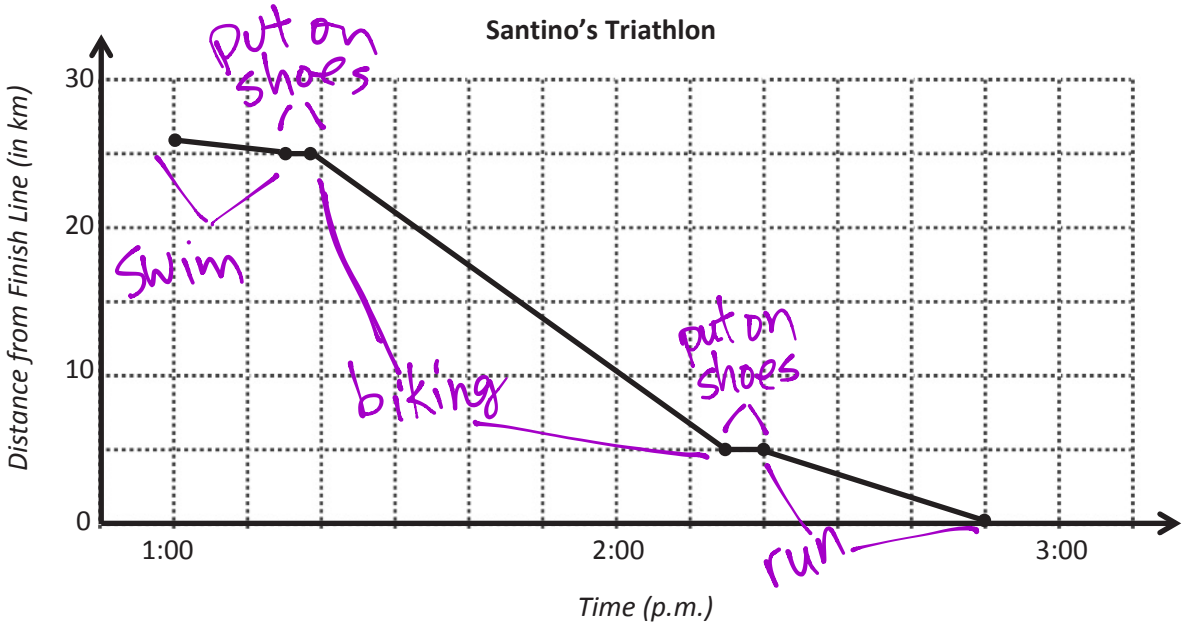
d. Howard received a payment from his job that went directly into his checking account. On which day did this most likely occur? Explain how you know.

It probably happened on May 17 because it jumped up that day.

e. Howard bought a new television during the time shown in the graph. On which day did this most likely occur? Explain how you know.

He probably bought the TV on May 19, because the line dropped that day.

2. The line graph below tracks Santino's time at the beginning and end of each part of a triathlon. Use the information in the graph to answer the questions that follow.



a. How long does it take Santino to finish the triathlon? 1 hour 50 minutes

b. To complete the triathlon, Santino first swims across a lake, then bikes through the city, and finishes by running around the lake. According to the graph, what was the distance of the running portion of the race?

5 kilometers

c. During the race, Santino pauses to put on his biking shoes and helmet, and then later to change into his running shoes. At what times did this most likely occur? Explain how you know.

1:15pm and 2:15pm. These times are where the line is flat indicating Santino is not making progress.

d. Which part of the race does Santino finish most quickly? How do you know?

Swimming was the stage that took the least amount of time.

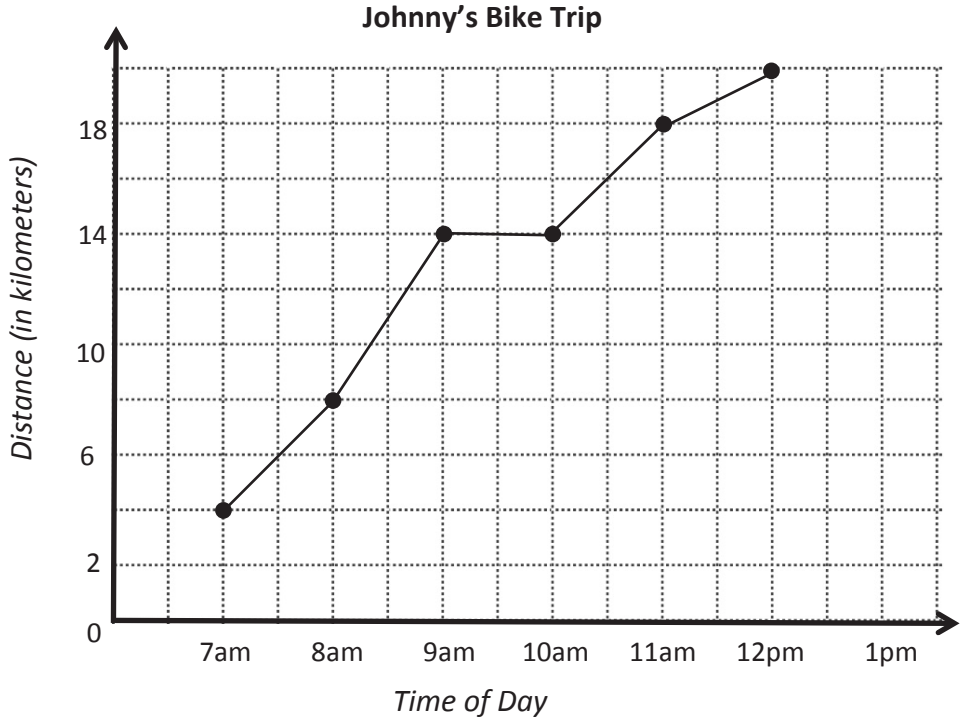
e. During which part of the triathlon is Santino racing most quickly? Explain how you know.

Biking was the fastest stage because the line is the steepest.

Name _____ Date _____

Use the graph to answer the questions.

Johnny left his home at 6 a.m. and kept track of the number of kilometers he traveled at the end of each hour of his trip. He recorded the data in a line graph.



a. How far did Johnny travel in all? How long did it take?

He travelled 20km in 6 hours.

b. Johnny took a one-hour break to have a snack and take some pictures. What time did he stop? How do you know?

His break was from 9 am to 10 am.

c. Did Johnny cover more distance before his break or after? Explain.

He covered more distance before his break (14 km) than after his break (6 km).

d. Between which two hours did Johnny ride 4 kilometers?

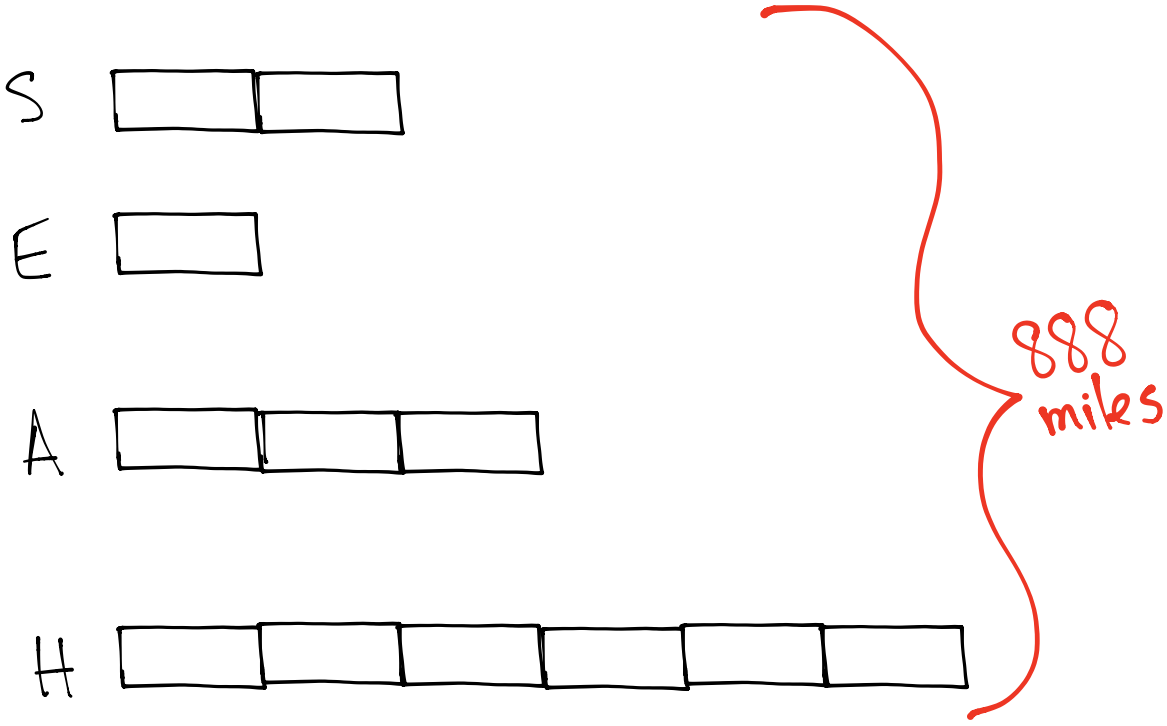
Between 10 am and 11 am.

e. During which hour did Johnny ride the fastest? Explain how you know.

He was the fastest between 8am and 9am because that is where the line is the steepest.

Name _____ Date _____

1. Sara travels twice as far as Eli when going to camp. Ashley travels as far as Sara and Eli together. Hazel travels 3 times as far as Sara. In total, all four travel 888 miles to camp. How far does each of them travel?



12 units = 888 miles
1 unit = 74 miles

Sara: 2 x 74 = 148 miles

Eli: 1 x 74 = 74 miles

Ashley: 3 x 74 = 222 miles

Hazel: 6 x 74 = 444 miles

The following problem is a brainteaser for your enjoyment. It is intended to encourage working together and family problem-solving fun. It is not a required element of this homework assignment.

2. A man wants to take a goat, a bag of cabbage, and a wolf over to an island. His boat will only hold him and one animal or item. If the goat is left with the cabbage, he'll eat it. If the wolf is left with the goat, he'll eat it. How can the man transport all three to the island without anything being eaten?

shore island

Goat
Cabbage
Wolf

Cabbage, Wolf — bring Goat → Goat
Goat — return empty ← Cabbage, Wolf

Wolf — bring cabbage → Cabbage
Goat — return with Goat ← Cabbage

Wolf — bring wolf → Wolf
Goat — return empty ← Cabbage

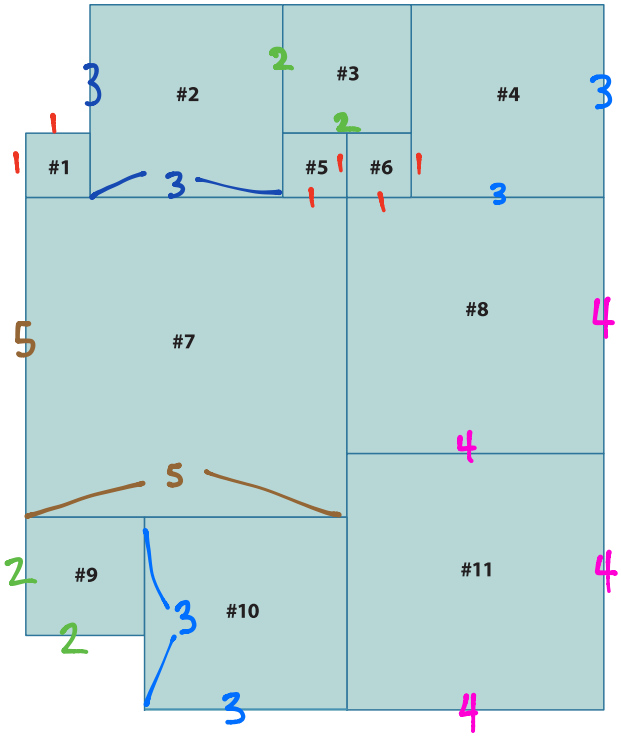
Goat — bring goat → Goat, Wolf, Cabbage

Name _____ Date _____

Solve using any method. Show all your thinking.

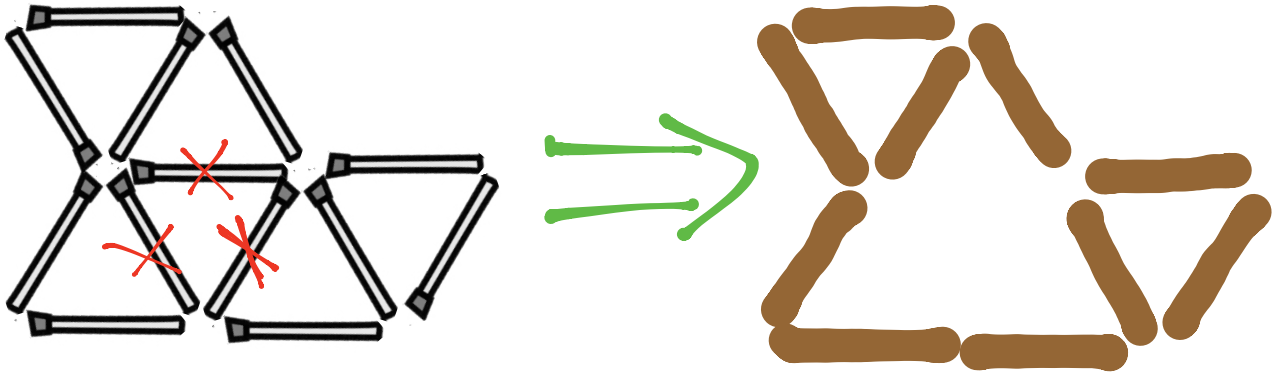
1. Study this diagram showing all squares. Fill in the table.

Figure	Area in Square Feet
1	1 ft^2
2	9 ft^2
3	4 ft^2
4	9 ft^2
5	1 ft^2
6	1 ft^2
7	25 ft^2
8	16 ft^2
9	4 ft^2
10	9 ft^2
11	16 ft^2



The following problem is a brainteaser for your enjoyment. It is intended to encourage working together and family problem-solving fun. It is not a required element of this homework assignment.

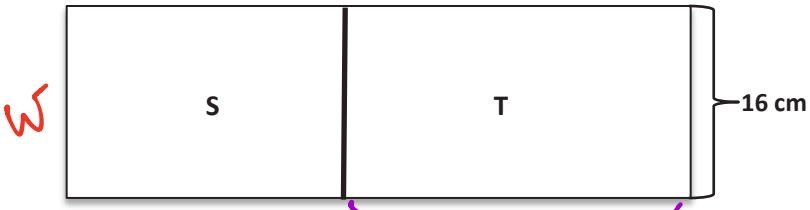
2. Remove 3 matches to leave 3 triangles.



Other solutions may be possible.

Name _____ Date _____

1. In the diagram, the length of Figure S is $\frac{2}{3}$ the length of Figure T. If S has an area of 368 cm^2, find the perimeter of the figure.



w

$l = 23$

$x = 34\frac{1}{2}$

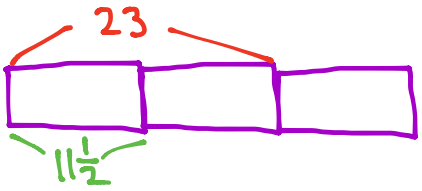
Area of S:

$A = l \cdot w$

$368 = l \cdot 16$

$23 = l$

23 is $\frac{2}{3}$ of x



2 units = 23

1 unit = $11\frac{1}{2}$

$x = 11\frac{1}{2} \times 3 = 34\frac{1}{2}$

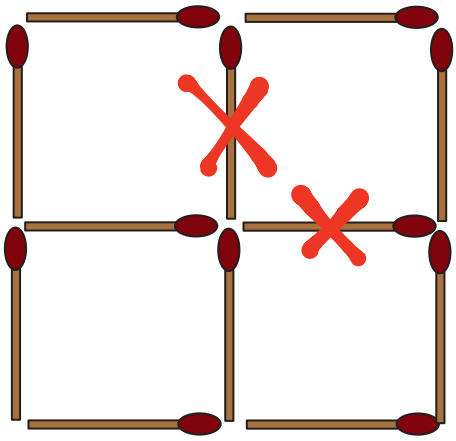
Perimeter = $23 + 23 + 34\frac{1}{2} + 34\frac{1}{2} + 16 + 16$

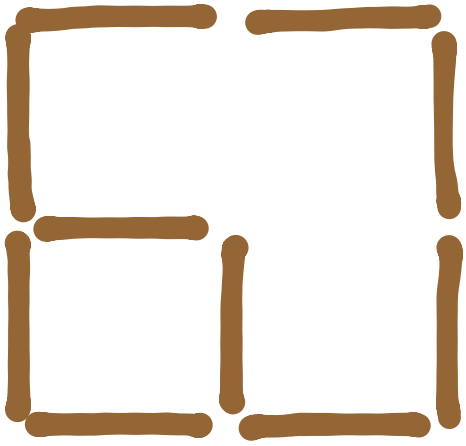
$46 + 69 + 32$

Perimeter = 147 cm

The following problems are puzzles for your enjoyment. They are intended to encourage working together and family problem-solving fun and are not a required element of this homework assignment.

2. Take 12 matchsticks arranged in a grid as shown below, and remove 2 matchsticks so 2 squares remain. How can you do this? Draw the new arrangement.

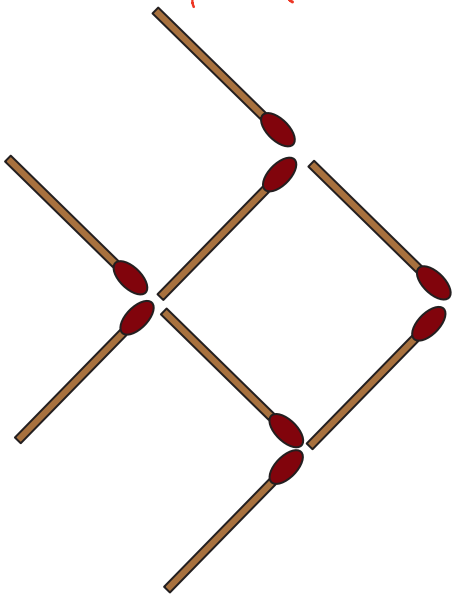


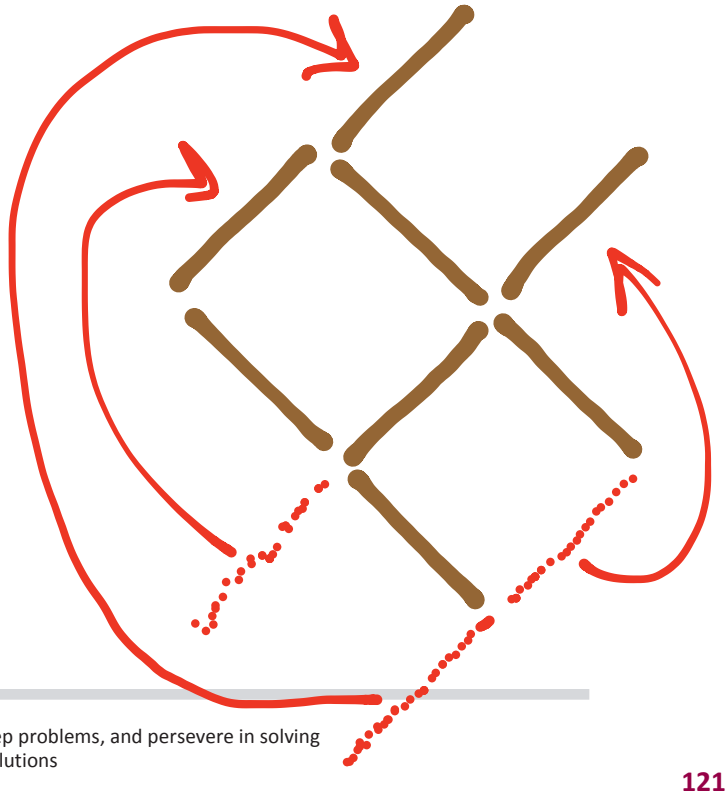


(other solutions may be possible.)

3. Moving only 3 matchsticks makes the fish turn around and swim the opposite way. Which matchsticks did you move? Draw the new shape.

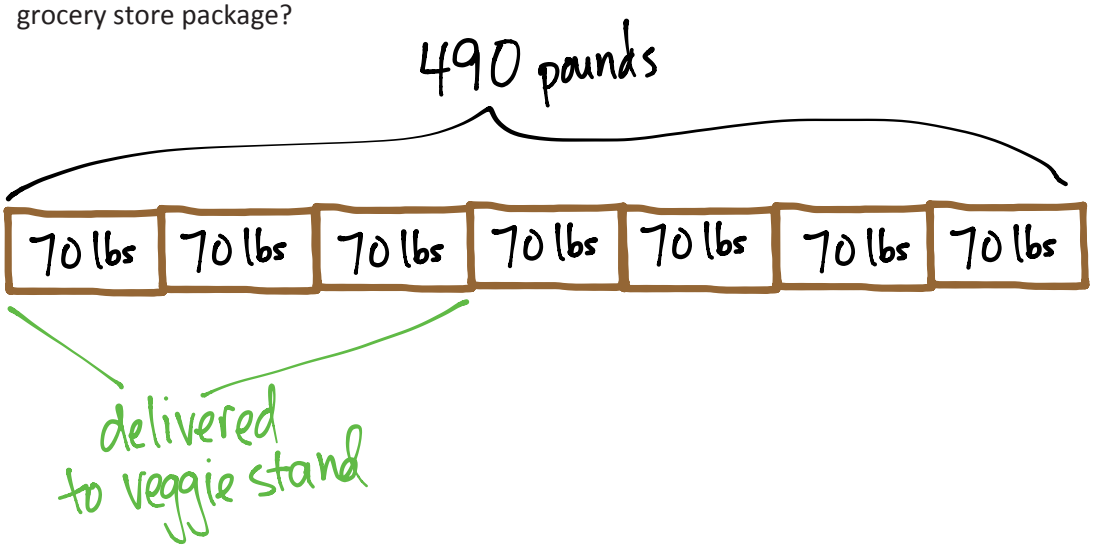
(other solutions may be possible.)



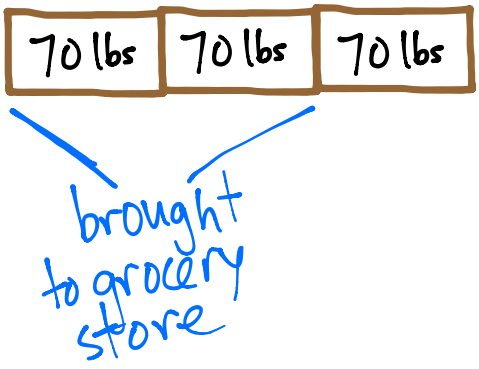


Name _____ Date _____

1. Pat's Potato Farm grew 490 pounds of potatoes. Pat delivered $\frac{3}{7}$ of the potatoes to a vegetable stand. The owner of the vegetable stand delivered $\frac{2}{3}$ of the potatoes he bought to a local grocery store, which packaged half of the potatoes that were delivered into 5-pound bags. How many 5-pound bags did the grocery store package?



7 units = 490
1 unit = 70



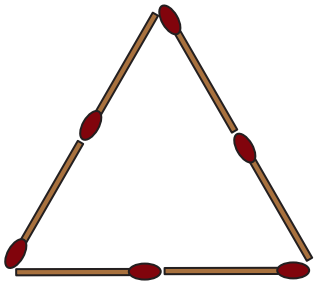
These are placed into 5-pound bags.

$$5\overline{)70}\quad 14$$
$$-5$$
$$20$$
$$-20$$
$$0$$

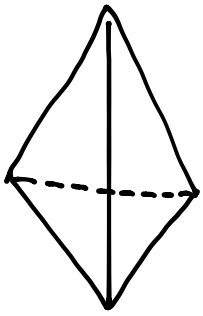
14 bags were made.

The following problems are for your enjoyment. They are intended to encourage working together and family problem-solving fun. They are not a required element of this homework assignment.

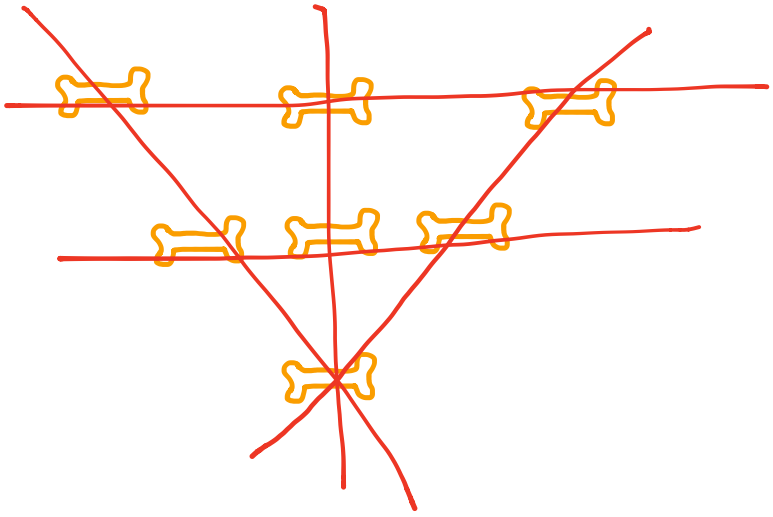
2. Six matchsticks are arranged into an equilateral triangle. How can you arrange them into 4 equilateral triangles without breaking or overlapping any of them? Draw the new shape.



Use the 6 matchsticks to create a pyramid with a triangular base.



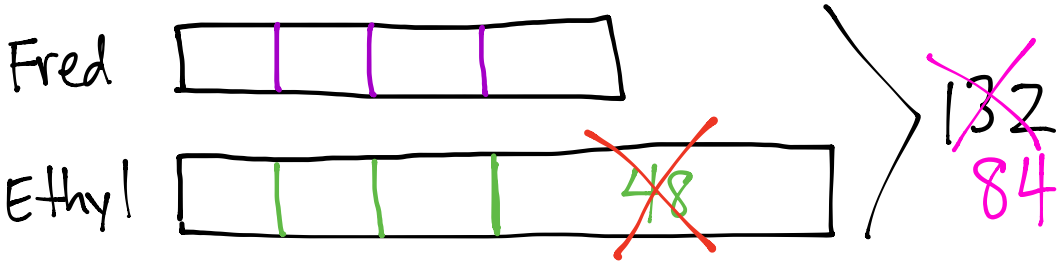
3. Kenny's dog, Charlie, is really smart! Last week, Charlie buried 7 bones in all. He buried them in 5 straight lines and put 3 bones in each line. How is this possible? Sketch how Charlie buried the bones.



Other solutions may be possible.

Name _____ Date _____

1. Fred and Ethyl had 132 flowers altogether at first. After Fred sold $\frac{1}{4}$ of his flowers and Ethyl sold 48 of her flowers, they had the same number of flowers left. How many flowers did each of them have at first?



132 − 48 = 84

7 units = 84

1 unit = 12

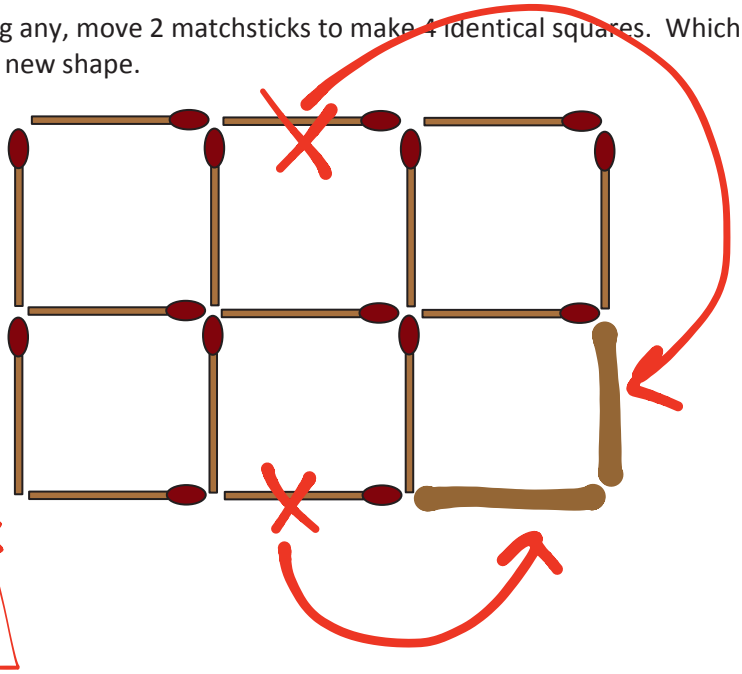
$$7\overline{)84} \quad 12 \quad -7 \quad 14 \quad -14 \quad 0$$

Fred = 12 x 4 = 48 flowers

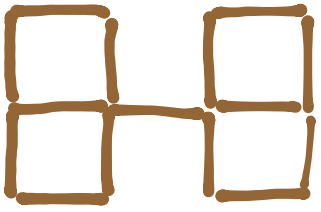
Ethyl = 12 x 3 + 48 = 36 + 48 = 84 flowers

The following problems are puzzles for your enjoyment. They are intended to encourage working together and family problem-solving fun. They are not a required element of this homework assignment.

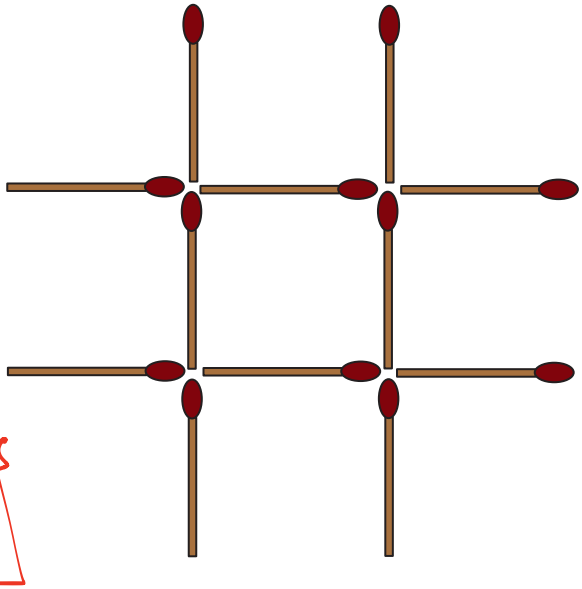
2. Without removing any, move 2 matchsticks to make 4 identical squares. Which matchsticks did you move? Draw the new shape.

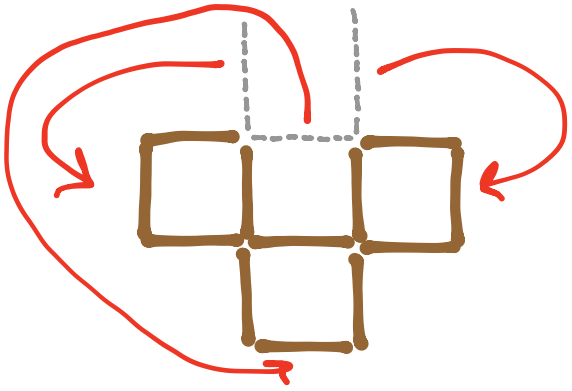


other solutions are possible



3. Move 3 matchsticks to form exactly (and only) 3 identical squares. Which matchsticks did you move? Draw the new shape.





other solutions are possible

Name _____ Date _____

1. For each written phrase, write a numerical expression, and then evaluate your expression.

a. Forty times the sum of forty-three and fifty-seven

Numerical expression:

$40 \times (43+57)$

Solution:

$40 \times (43+57)$

$= 40 \times 100$

$= 4{,}000$

b. Divide the difference between one thousand three hundred and nine hundred fifty by four

Numerical expression:

$\frac{1300-950}{4}$

Solution:

$\frac{1300-950}{4} = \frac{350}{4} = 87\frac{1}{2}$

c. Seven times the quotient of five and seven

Numerical expression:

$7 \times (\frac{5}{7})$

Solution:

$7 \times (\frac{5}{7}) = \frac{35}{7} = 5$

d. One fourth the difference of four sixths and three twelfths

Numerical expression:

$\frac{1}{4} \times (\frac{4}{6} - \frac{3}{12})$

Solution:

$\frac{1}{4} \times (\frac{4}{6} - \frac{3}{12})$

$= \frac{1}{4} \times (\frac{8}{12} - \frac{3}{12})$

$= \frac{1}{4} \times \frac{5}{12}$

$= \frac{5}{48}$

2. Write at least 2 numerical expressions for each written phrase below. Then, solve.

   a. Three fifths of seven

   $\frac{3}{5} \times 7$ $\quad 3 \times \frac{1}{5} \times 7$

   $= \frac{21}{5}$

   $= 4\frac{1}{5}$

   b. One sixth the product of four and eight

   $\frac{1}{6} \times (4 \times 8)$ $\quad \frac{4 \times 8}{6}$

   $= \frac{1}{6} \times 32$

   $= \frac{32}{6} = 5\frac{2}{6} = 5\frac{1}{3}$

3. Use <, >, or = to make true number sentences without calculating. Explain your thinking.

   a. 4 tenths + 3 tens + 1 thousandth $<$ 30.41

   1 thousandth is smaller than 1 hundredth

   b. $\left(5 \times \frac{1}{10}\right) + \left(7 \times \frac{1}{1000}\right)$ $=$ 0.507

   Expanded notation

   c. 8×7.20 $<$ $8 \times 4.36 + 8 \times 3.59$

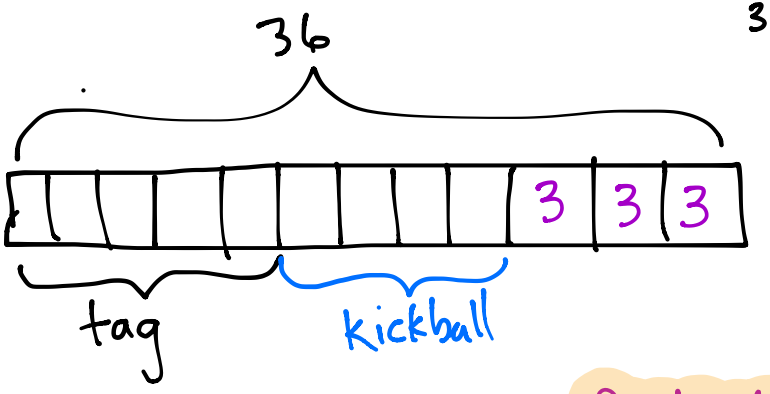
   $7.2 < (4.36 + 3.59)$

Name _____ Date _____

1. Use the RDW process to solve the word problems below.

   a. There are 36 students in Mr. Meyer's class. Of those students, $\frac{5}{12}$ played tag at recess, $\frac{1}{3}$ played kickball, and the rest played basketball. How many students in Mr. Meyer's class played basketball?

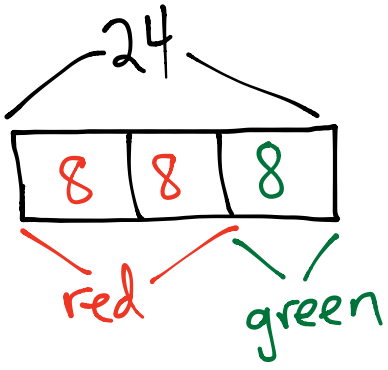
$\frac{1}{3} \times 4 = \frac{4}{12}$



12 units = 36
1 unit = 3

9 played basketball

   b. Julie brought 24 apples to school to share with her classmates. Of those apples, $\frac{2}{3}$ are red and the rest are green. Julie's classmates ate $\frac{3}{4}$ of the red apples and $\frac{1}{2}$ of the green apples. How many apples are left?



$\frac{3}{4}$ of 16 apples

$\frac{3}{4} \times 16^{4} = 12$

16 − 12 = 4

4 red apples left

$\frac{1}{2}$ of 8 apples

$\frac{1}{2} \times 8^{4} = 4$

8 − 4 = 4

4 green apples left

8 apples are left

2. Write and solve a word problem for each expression in the chart below.

Problems will vary. Exact answers

Expression	Word Problem	Solution
$144 \times \frac{7}{12}$	There are 144 fifth graders at a camp. $\frac{7}{12}$ of them are girls. How many girls attended the camp?	$144 \times \frac{7}{12} = 12$ 12 girls
$9-\left(\frac{4}{9}+\frac{1}{3}\right)$	Chris has 9 cups of sugar. She uses $\frac{4}{9}$ cup to bake cookies and $\frac{1}{3}$ cup to bake a cake. How much sugar does she have left over?	$9-\left(\frac{4}{9}+\frac{1}{3}\right)$ $=9-\left(\frac{4}{9}+\frac{3}{9}\right)$ $=9-\frac{7}{9}$ $=8\frac{2}{9}$ cups
$\frac{3}{4} \times (36+12)$	36 children and 12 adults are at a party. $\frac{3}{4}$ of them ate the cake. How many is this?	$\frac{3}{4} \times (36+12)$ $=\frac{3}{4} \times (48)$ $=36$

Answers will vary

Name _____ Date _____

1. Use what you learned about your fluency skills today to answer the questions below.

   a. Which skills should you practice this summer to maintain and build your fluency? Why?

   b. Write a goal for yourself about a skill that you want to work on this summer.

   c. Explain the steps you can take to reach your goal.

   d. How will reaching this goal help you as a math student?

Answers will vary.

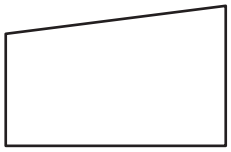
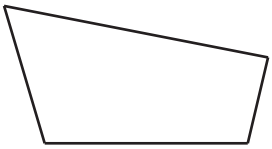
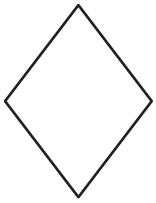
2. In the chart below, plan a new fluency activity that you can play at home this summer to help you build or maintain a skill that you listed in Problem 1(a). When planning your activity, be sure to think about the factors listed below:

   - The materials that you'll need.
   - Who can play with you (if more than 1 player is needed).
   - The usefulness of the activity for building your skills.

Skill:
Name of Activity:
Materials Needed:
Description:

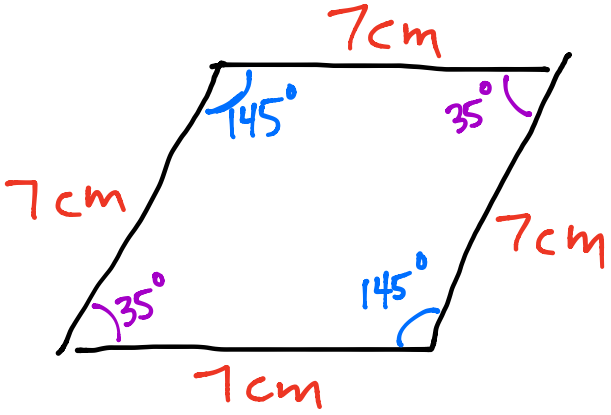
Name _____ Date _____

1. Use your ruler, protractor, and set square to help you give as many names as possible for each figure below. Then, explain your reasoning for how you named each figure.

Figure	Names	Reasoning for Names
a. 	Quadrilateral Trapezoid	Has four sides 1 pair of parallel sides
b. 	Quadrilateral	Has four sides
c. 	Quadrilateral Trapezoid Parallelogram	Has four sides at least 1 pair of parallel sides Opposite sides are congruent
d. 	Quadrilateral Trapezoid Parallelogram Kite Rhombus	Has four sides at least 1 pair of parallel sides Opposite sides are congruent Adjacent sides are congruent All sides are congruent

2. Mark draws a figure that has the following characteristics:
   - Exactly 4 sides that are each 7 centimeters long
   - Two sets of parallel lines
   - Exactly 4 angles that measure 35 degrees, 145 degrees, 35 degrees, and 145 degrees

   a. Draw and label Mark's figure below.



   b. Give as many names of quadrilaterals as possible for Mark's figure. Explain your reasoning for the names of Mark's figure.

Quadrilateral Has four sides
Trapezoid at least 1 pair of parallel sides
Parallelogram Opposite sides are congruent
Kite Adjacent sides are congruent
Rhombus All sides are congruent

   c. List the names of Mark's figure in Problem 2(b) in order from least specific to most specific. Explain your thinking.

Quadrilateral Trapezoid Parallelogram Kite Rhombus
?

Answers will vary

Name _____ Date _____

Teach someone at home how to play one of the games you played today with your pictorial vocabulary cards. Then, answer the questions below.

1. What games did you play?

2. Who played the games with you?

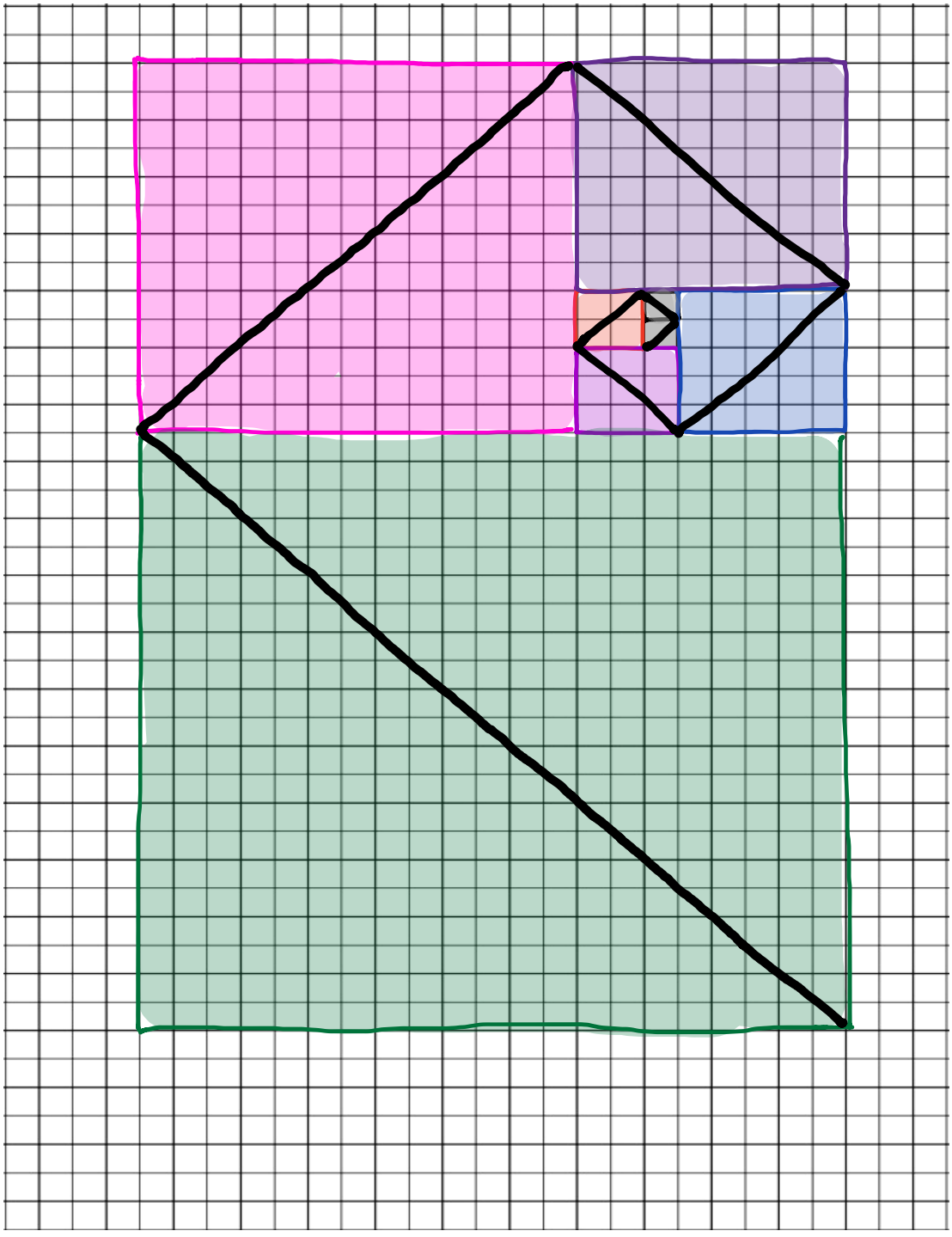
3. What was it like to teach someone at home how to play?

4. Did you have to teach the person who played with you any of the math concepts before you could play? Which ones? What was that like?

5. When you play these games at home again, what changes will you make? Why?

Name _____ Date _____

1. List the Fibonacci numbers up to 21, and create, on the graph below, a spiral of squares corresponding to each of the numbers you write.



2. In the space below, write a rule that generates the Fibonacci sequence.

Add the previous two Fibonacci numbers to get the next Fibonacci number in the sequence.

3. Write at least the first 15 numbers of the Fibonacci sequence.

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610

Name _____ Date _____

1. Jonas played with the Fibonacci sequence he learned in class. Complete the table he started.

1	2	3	4	5	6	7	8	9	10
1	1	2	3	5	8	13	21	34	55

11	12	13	14	15	16	17	18	19	20
89	144	233	377	610	987	1597	2584	4181	6765

2. As he looked at the numbers, Jonas realized he could play with them. He took two consecutive numbers in the pattern and multiplied them by themselves and then added them together. He found they made another number in the pattern. For example, $(3 \times 3) + (2 \times 2) = 13$, another number in the pattern. Jonas said this was true for any two consecutive Fibonacci numbers. Was Jonas correct? Show your reasoning by giving at least two examples of why he was or was not correct.

$(F_3)^2 + (F_4)^2$
$= 4 + 9$
$= 13$ ← F_7

$(F_5)^2 + (F_6)^2$
$= 25 + 64$
$= 89$ ← F_{11}

$(F_9)^2 + (F_{10})^2$
$= 1156 + 3025$
$= 4181$ ← F_{19}

It appears as though his idea works!

3. Fibonacci numbers can be found in many places in nature. For example, the number of petals in a daisy, the number of spirals in a pine cone or a pineapple, and even the way branches grow on a tree. Find an example of something natural where you can see a Fibonacci number in action, and sketch it here.

Answers will vary.

Name _____ Date _____

1. Find various rectangular boxes at your home. Use a ruler to measure the dimensions of each box to the nearest centimeter. Then, calculate the volume of each box. The first one is partially done for you.

Item	Length	Width	Height	Volume
Juice Box	11 cm	2 cm	5 cm	110 cm^3
Cereal Box	20 cm	6 cm	33 cm	3960 cm^3

Additional answers will vary

2. The dimensions of a small juice box are 11 cm by 4 cm by 7 cm. The super-size juice box has the same height of 11 cm but double the volume. Give two sets of the possible dimensions of the super-size juice box and the volume.

11 cm by 4 cm by 7 cm = 308 cm^3

11 cm x 8 cm x 7 cm = 616 cm^3

11 cm x 4 cm x 14 cm = 616 cm^3

Video tutorials: http://bit.ly/eurekapusd
Info for parents: http://bit.ly/pusdmath