

Name _____

Date _____

1. Complete the table for the given rules.

Line a

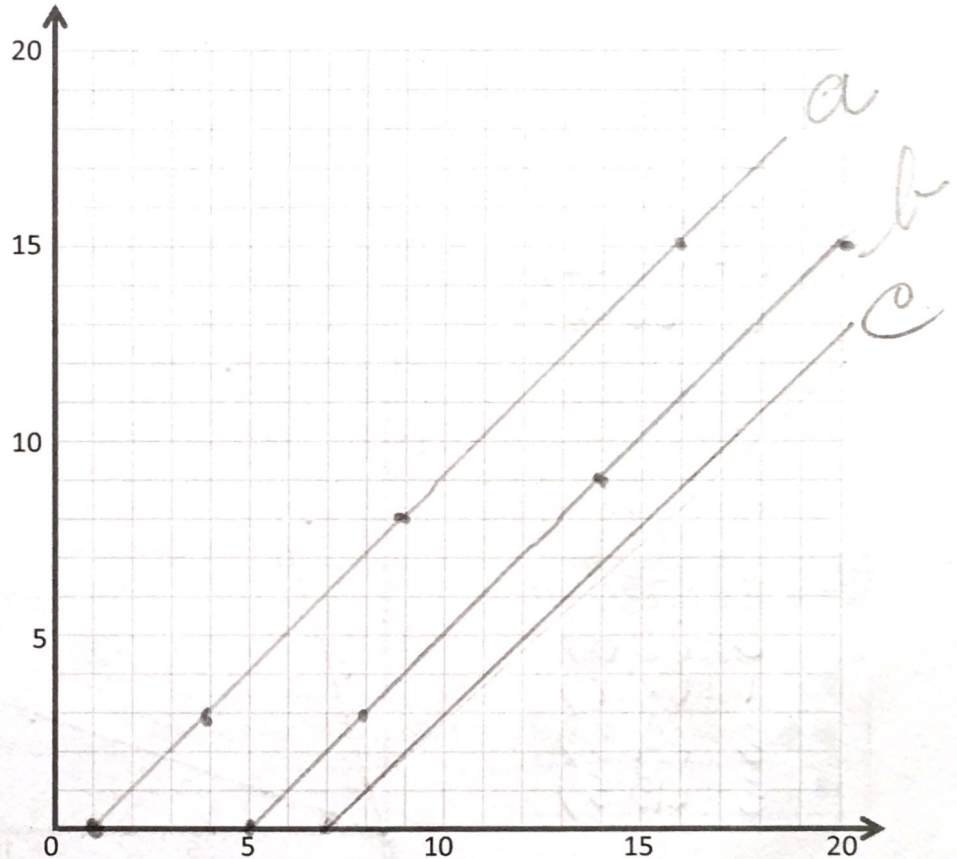
Rule: y is 1 less than x

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)



- Construct each line on the coordinate plane.
- Compare and contrast these lines.

They are parallel
 a starts at (1,0) and their y is one less than its x
 b starts at (5,0) and their y is 5 less than x

- 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.

(7,0) (8,1)

c will be parallel.

2. Complete the table for the given rules.

Line e

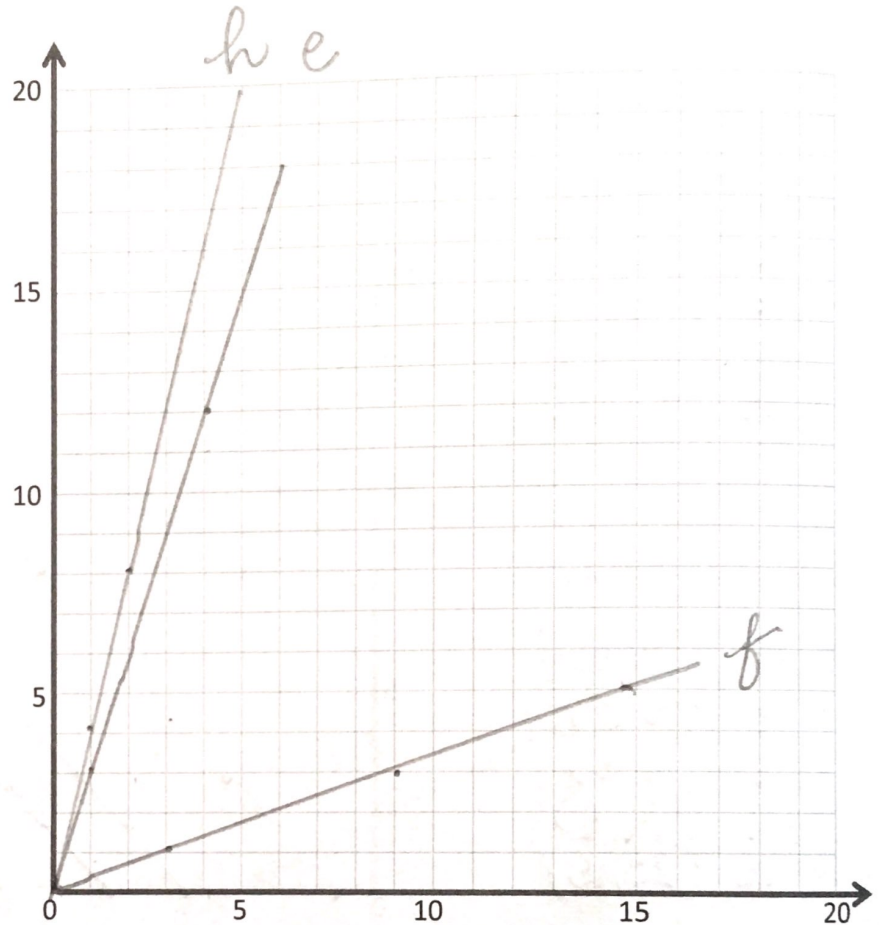
Rule: y is 3 times as much as x

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.

Both lines start at the origin point $(0,0)$.
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.

$(0,0)$ $(1,4)$ $(2,8)$

h will start at the origin point $(0,0)$, and it will be steeper than e .

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

a. Line p represents the rule x and y are equal.

✓ b. Construct a line, d , that is parallel to line p and contains point D .

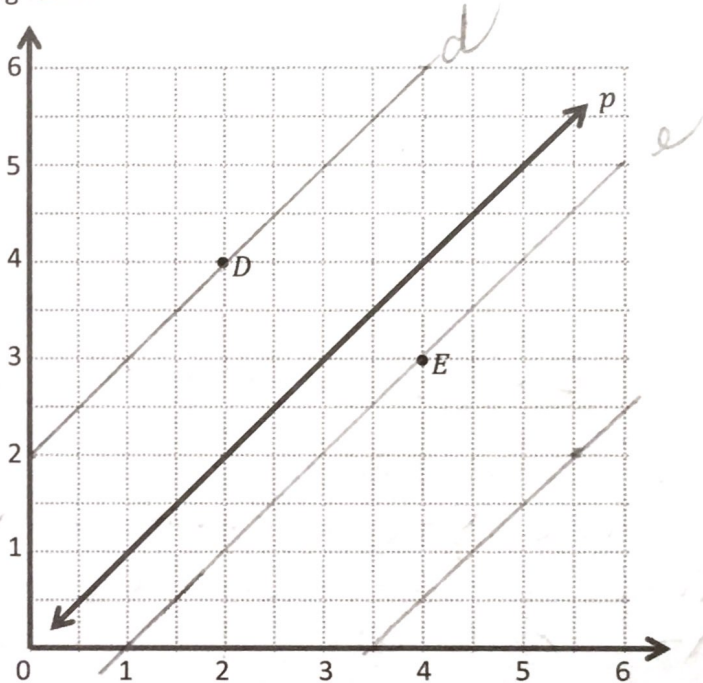
c. Name 3 coordinate pairs on line d .

$(0, 2)$ $(1, 3)$ $(4, 6)$

✓ d. Identify a rule to describe line d .

Coordinate y is 2 more than coordinate x

✓ e. Construct a line, e , that is parallel to line p and contains point E .



✓ f. Name 3 points on line e .

$(1, 0)$ $(2, 1)$ $(4, 3)$

✓ g. Identify a rule to describe line e .

Coordinate y is one less than coordinate x .

h. Compare and contrast lines d and e in terms of their relationship to line p .

Lines d and e are parallel.
Line d is above line e because the y coordinates are greater than the x coordinate.

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.

$(3\frac{1}{2}, 0)$ $(5\frac{1}{2}, 2)$

The y -coordinate is 3 less than the x -coordinate.
In d , p , and e the y -coordinate is less than the x -coordinate.

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

✓ a. Line p represents the rule x and y are equal.

✓ b. Construct a line, v , that contains the origin and point V .

✓ c. Name 3 points on line v .

$(2, 4)$ $(3, 6)$ $(4, 8)$

✓ d. Identify a rule to describe line v .

The y -coordinate is twice as much as the x -coordinate.

✓ e. Construct a line, w , that contains the origin and point W .

f. Name 3 points on line w .

$(2, 1)$ $(4, 2)$ $(8, 4)$

g. Identify a rule to describe line w .

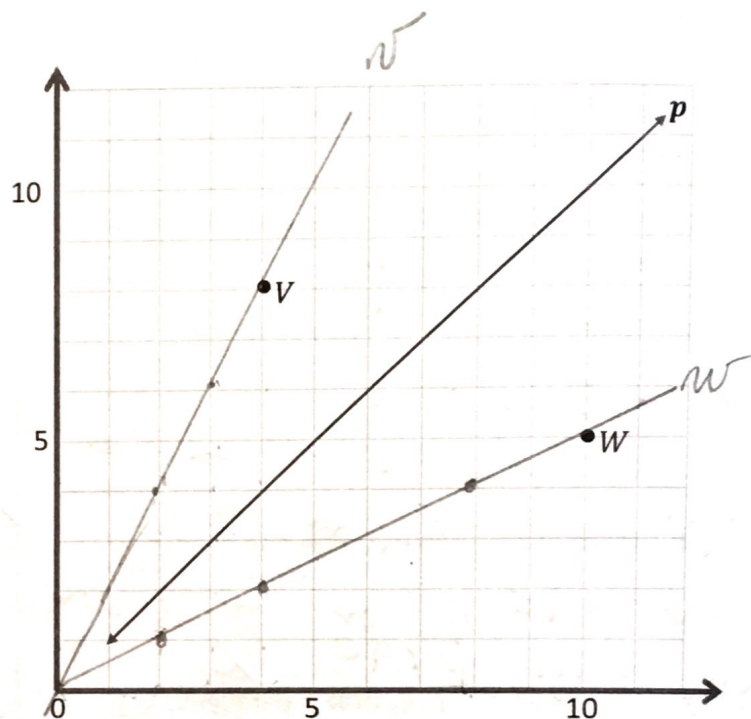
The y -coordinate is half of the x -coordinate.

h. Compare and contrast lines v and w in terms of their relationship to line p .

v and w intersect at the origin point. v is above p , and w is under p .

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

The lines go upward.



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1. Complete the tables for the given rules.

Line l

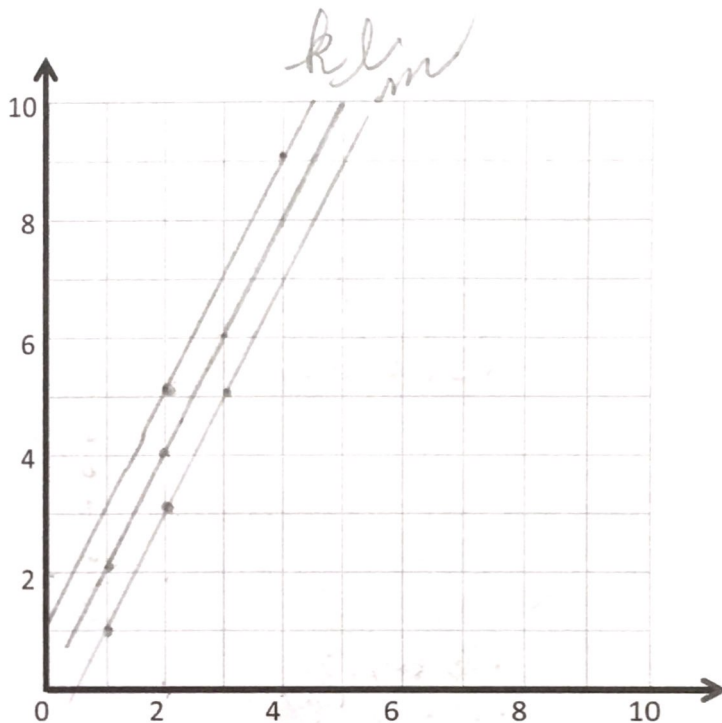
Rule: Double x

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

Line m

Rule: Double x , and 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.

l and m are parallel. l is above m. The distance between the two lines is 1.

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

I predict the new line will be parallel to both lines. The distance between k and l is one

2. Circle the point(s) that the line for the rule multiply x by $\frac{1}{2}$, and 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.

$2 \times \frac{1}{2} = 1 \quad 1 + 1 = 2$

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

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

3. Complete the tables for the given rules.

Line ℓ

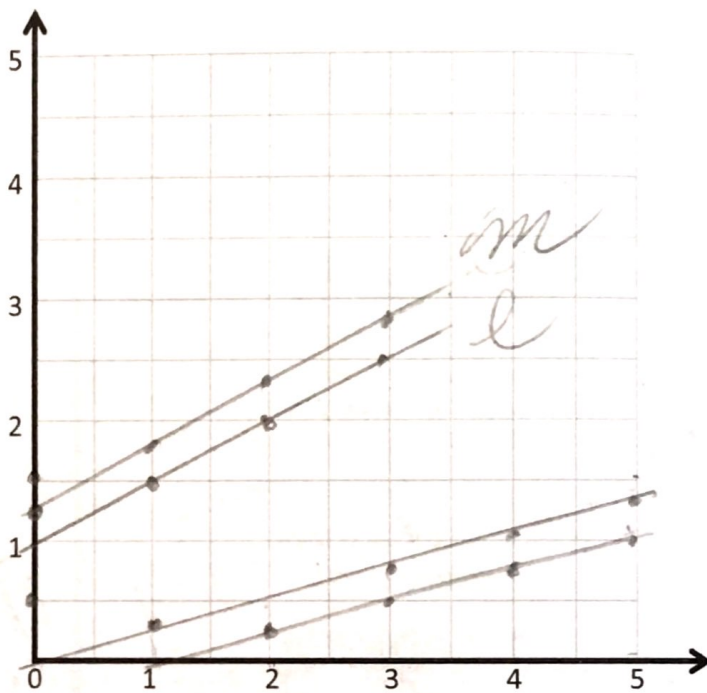
Rule: Halve x , and then add 1

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 , and 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.

Both are parallel. They are $\frac{1}{4}$ distance apart.

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

I predict it would not be parallel to m and ℓ .

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

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

$2 \times \frac{3}{4} = \frac{6}{4}$
 $\frac{6}{4} - \frac{1}{2} = \frac{4}{4} = 1$

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

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

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

a. Explain how you know.

I did all the calculations.

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

$(4, 1)$ $(5, 1\frac{1}{4})$

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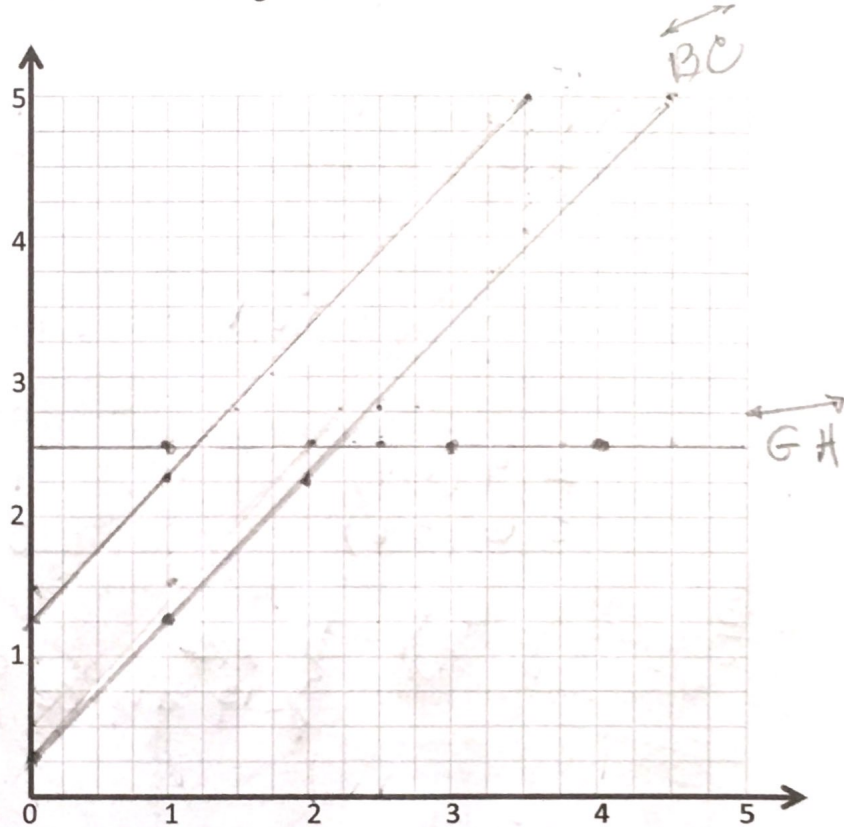
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- ✓ 1. Write a rule for the line that contains the points $(0, \frac{1}{4})$ and $(2\frac{1}{2}, 2\frac{3}{4})$.

The y-coordinate is $\frac{1}{4}$ more than the x-coordinate

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

Point	x	y	(x, y)
B	2	$2\frac{1}{4}$	$(2, 2\frac{1}{4})$
C	1	$1\frac{1}{4}$	$(1, 1\frac{1}{4})$



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

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.

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

- b. Write a rule for a line that is parallel to \overline{GH} .

Y is always 4

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 is $\frac{3}{4}$ more than x

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

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

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

c. Multiplication: y is twice x

Point	x	y	(x, y)
A	2	4	(2, 4)
B	3	6	(3, 6)

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

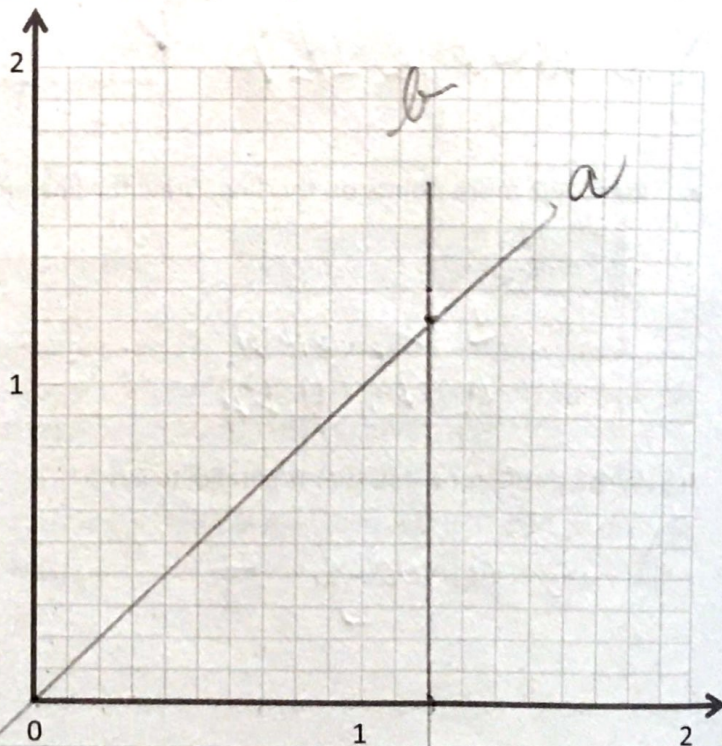
Point	x	y	(x, y)
V	$\frac{3}{4}$	1	$(\frac{3}{4}, 1)$
W	$\frac{3}{4}$	3	$(\frac{3}{4}, 3)$

e. Multiplication with addition: y is twice x + 1

Point	x	y	(x, y)
R	1	3	(1, 3)
S	2	5	(2, 5)

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*.

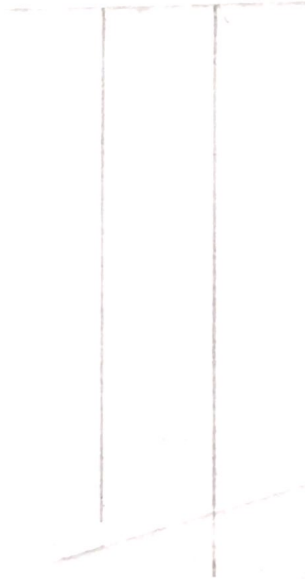
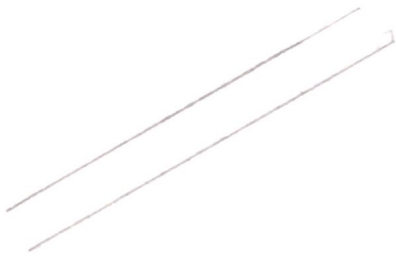
line a y equals x
line b x is always 1.2



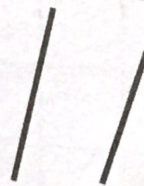
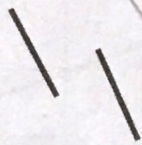
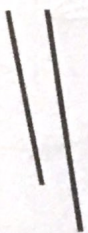
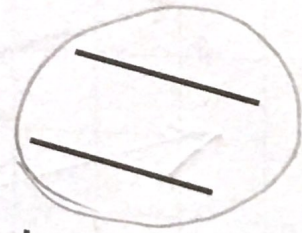
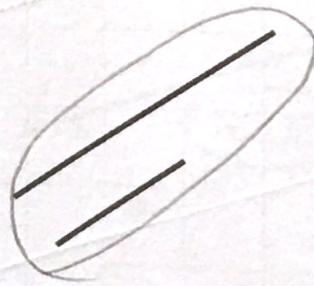
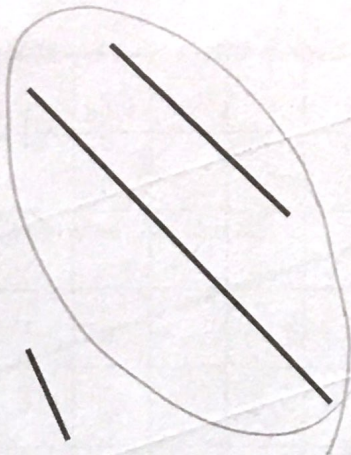
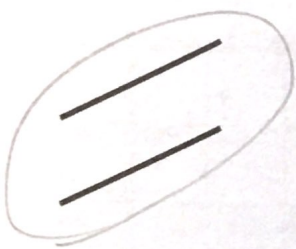
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- Use your right angle template and straightedge to draw at least three sets of parallel lines in the space below.



- Circle the segments that are parallel.



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

The grid contains six sub-problems for drawing parallel segments:

- a.** A thick horizontal segment is shown above a thin horizontal segment passing through point *S*.
- b.** A thick vertical segment is shown to the right of a thin vertical segment passing through point *T*.
- c.** A thick diagonal segment sloping down to the right is shown to the left of a thin diagonal segment passing through point *U*.
- d.** A thick diagonal segment sloping down to the right is shown above a thin diagonal segment passing through point *V*.
- e.** A thick diagonal segment sloping up to the right is shown below a thin diagonal segment passing through point *W*.
- f.** A thick diagonal segment sloping down to the right is shown to the left of a thin diagonal segment passing through point *Z*.

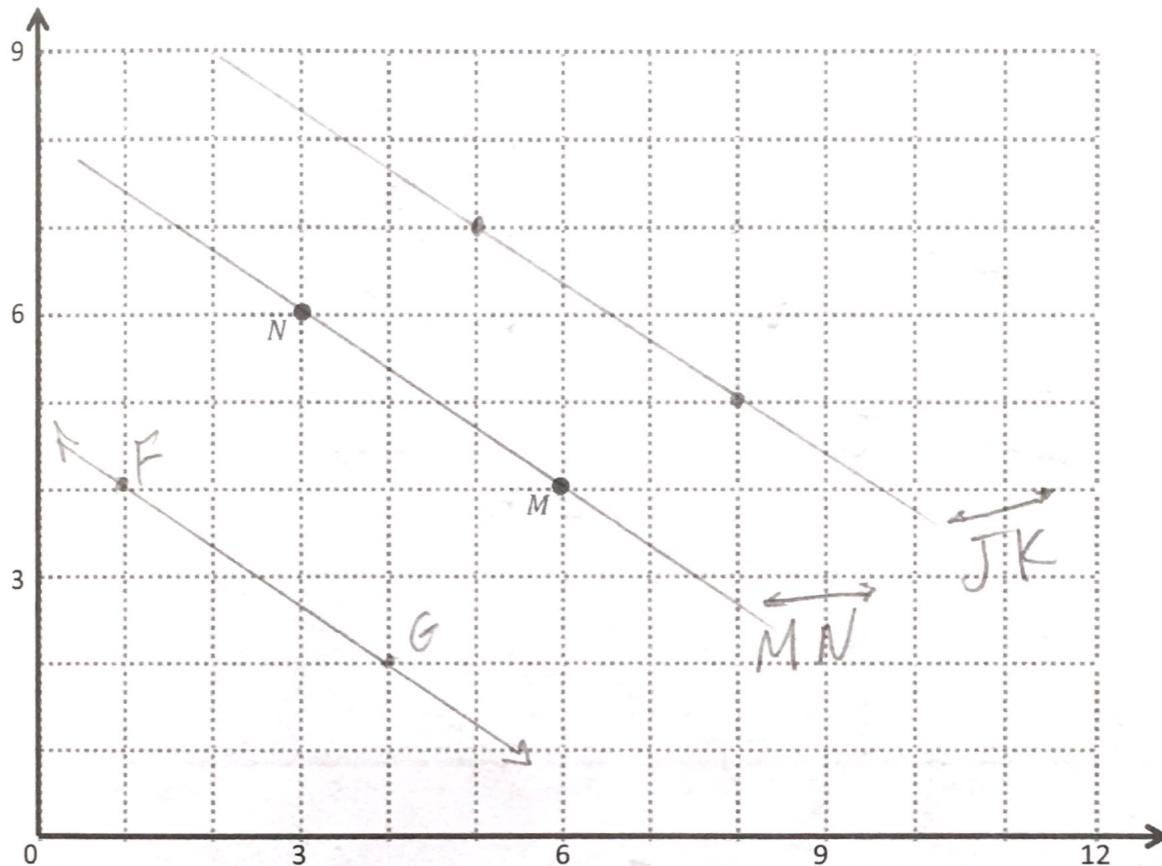
4. Draw 2 different lines parallel to line *ℓ*.

The grid shows a thick black line labeled *ℓ* sloping down to the right. Two thin grey lines have been drawn parallel to it, one above and one below, with arrows at both ends of each line to indicate they are lines, not just segments.

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

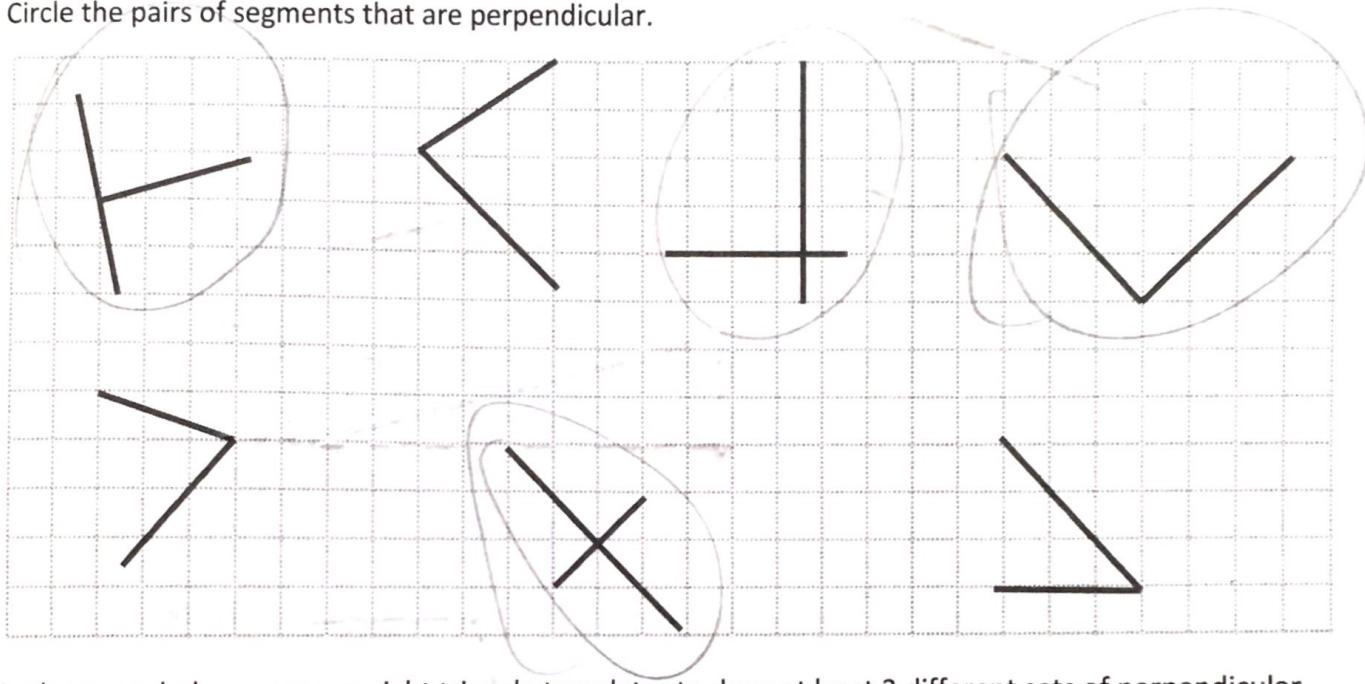


- ✓ a. Identify the locations of M and N . $M: (3, 6)$ $N: (6, 4)$
- ✓ b. Draw \overline{MN} .
- c. Plot the following coordinate pairs on the plane.
 $J: (5, 7)$ $K: (8, 5)$
- ✓ d. Draw \overline{JK} .
- ✓ e. Circle the relationship between \overline{MN} and \overline{JK} . $\overline{MN} \perp \overline{JK}$ $\overline{MN} \parallel \overline{JK}$
- ✓ f. Give the coordinates of a pair of points, F and G , such that $\overline{FG} \parallel \overline{MN}$.
 $F: (1, 4)$ $G: (4, 2)$
- ✓ g. Draw \overline{FG} .

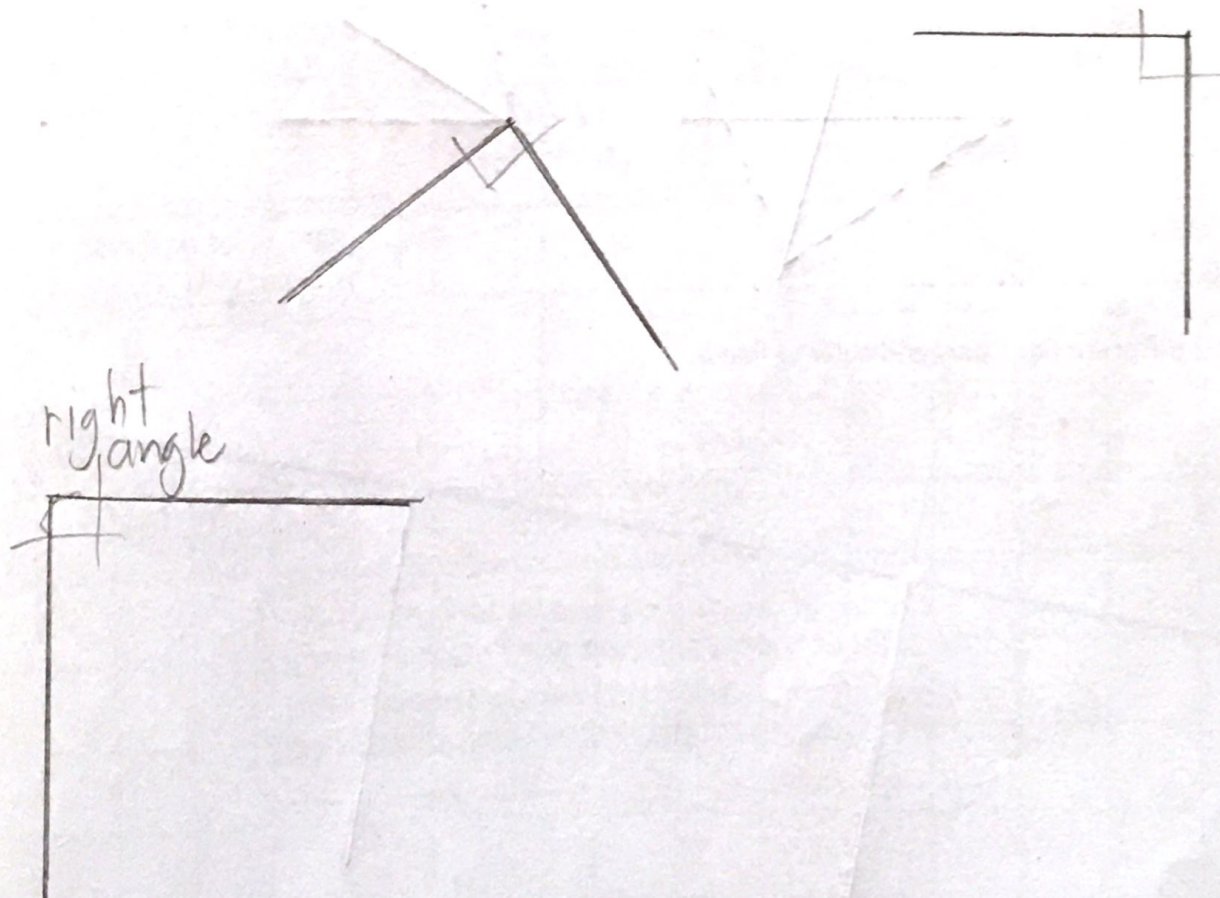
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1. Circle the pairs of segments that are perpendicular.



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.

The diagrams show the following constructions:

- a.** A solid line segment is drawn. A right triangle is sketched with dashed lines, with one leg parallel to the segment and the other leg perpendicular to it. A solid perpendicular segment is drawn from the midpoint of the original segment.
- b.** A solid line segment is drawn. A right triangle is sketched with dashed lines, with one leg parallel to the segment and the other leg perpendicular to it. A solid perpendicular segment is drawn from the midpoint of the original segment.
- c.** A solid line segment is drawn. A right triangle is sketched with dashed lines, with one leg parallel to the segment and the other leg perpendicular to it. A solid perpendicular segment is drawn from the midpoint of the original segment.
- d.** A solid line segment is drawn. A right triangle is sketched with dashed lines, with one leg parallel to the segment and the other leg perpendicular to it. A solid perpendicular segment is drawn from the midpoint of the original segment.

4. Draw 2 different lines perpendicular to line *b*.

The diagram shows a line labeled *b* drawn across the grid. Two other lines are drawn perpendicular to line *b*, one on the left and one on the right, both intersecting line *b* at right angles.

- rotate means moving in a circle around an edge
- slide means moving every point of a plane figure in the same direction and same distance.

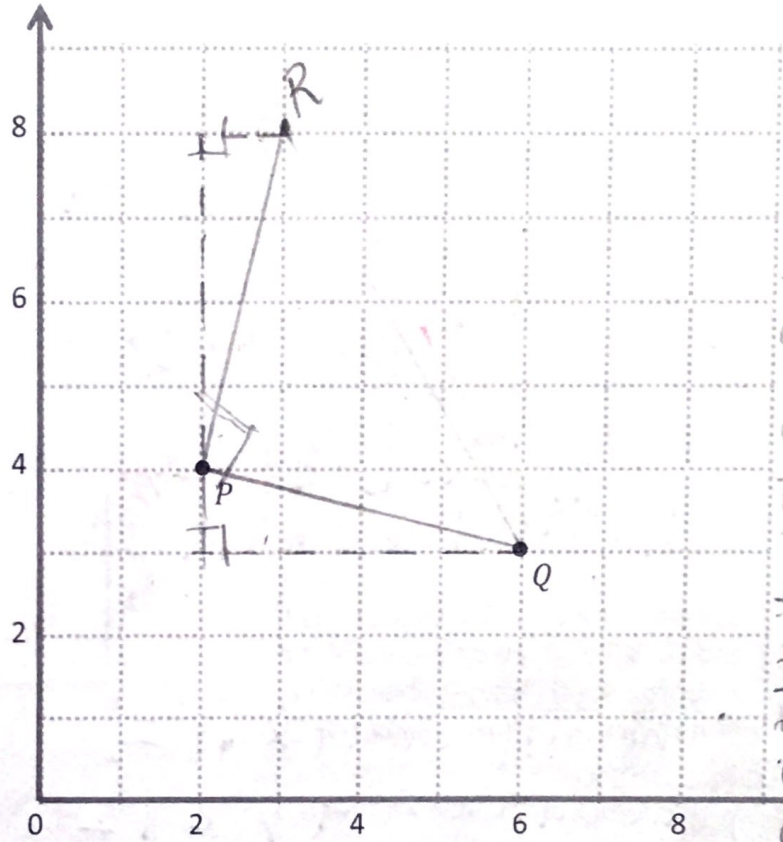
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• A right triangle has 2 acute angles that add to 90°

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

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

$P(2, 4)$
 $Q(6, 3)$
 $R(3, 8)$



$\angle RPQ$ is a right angle
 If I slide and rotate any of the two right triangles I sketch the two acute angles form together a 90° .
 So $\angle RPQ$ is a right angle as well.

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

The difference of the x -coordinate is 4.

The difference of the y -coordinate is 1.

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

The difference of x coordinates is 1

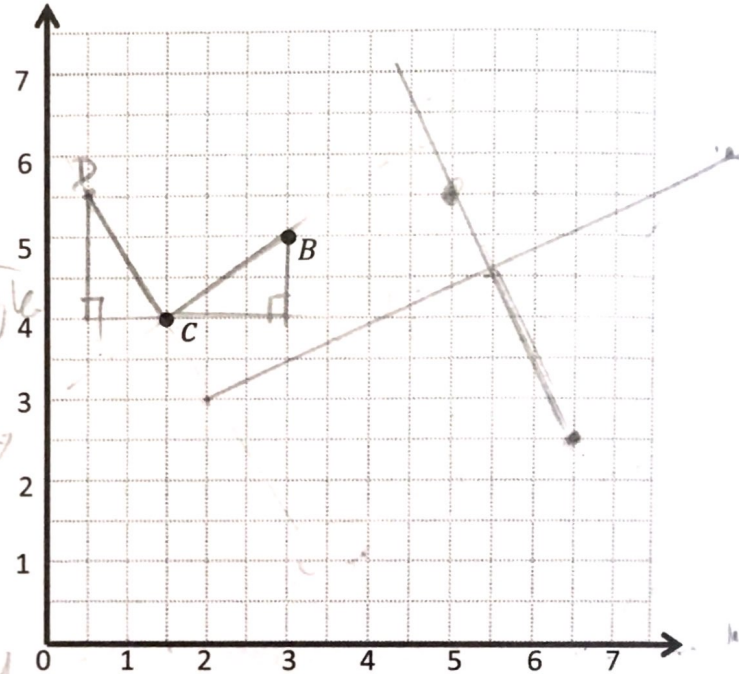
The difference of y coordinates is 4

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

The relationship of the difference in the value is either 1 or 4. It means that two of the triangle's sides measure 4

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

- a. Draw \overline{CB} .
- b. Plot point $D \left(\frac{1}{2}, 5\frac{1}{2} \right)$.
- c. Draw \overline{CD} .
- d. Explain how you know $\angle DCB$ is a right angle without measuring it.



I used the grid to sketch a right triangle. I slid and rotated it and to form another triangle.

(1.5, 4)
(3, 5)
The difference of x is 1.5
The difference of y is 1

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

(1.5, 4)
(0.5, 5.5)
The difference of x is 1,
The difference of y is 1.5

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

The relationship is that the differences are 1 and 1.5 in both. The height of the triangles are 1 and 1.5

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

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

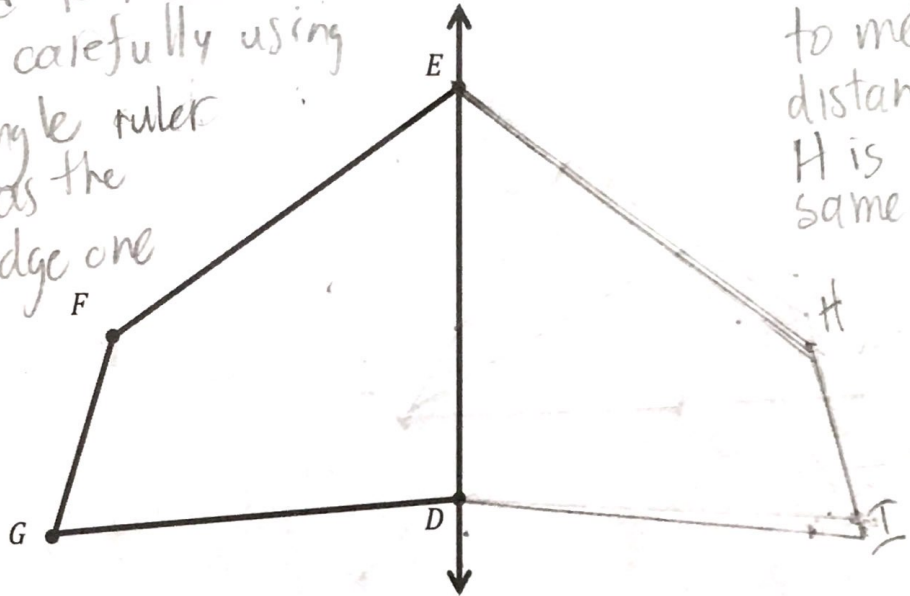
$U: (5, 5\frac{1}{2})$ $V: (6\frac{1}{2}, 2\frac{1}{2})$

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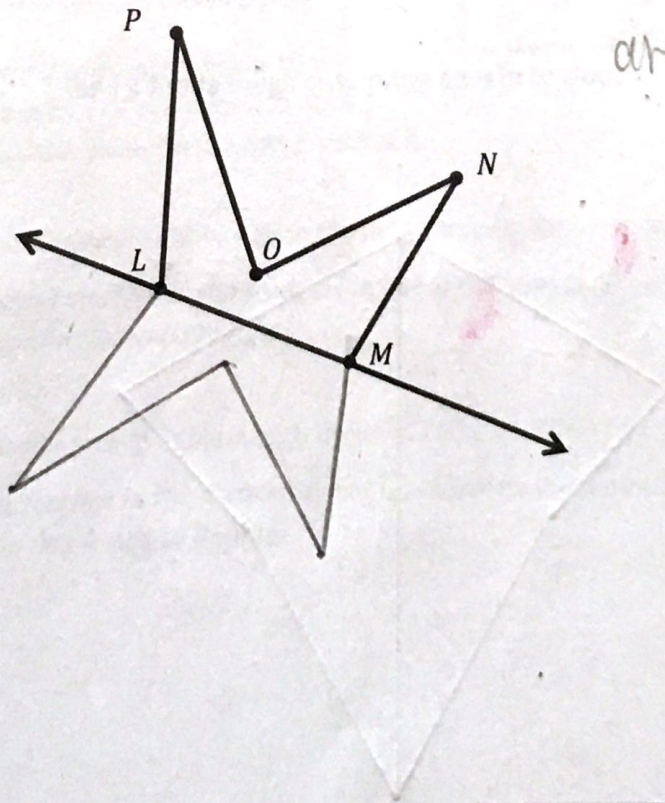
1. Draw to create a figure that is symmetric about \overleftrightarrow{DE} .

* You need to measure and position carefully using the triangle ruler as well as the straight edge one



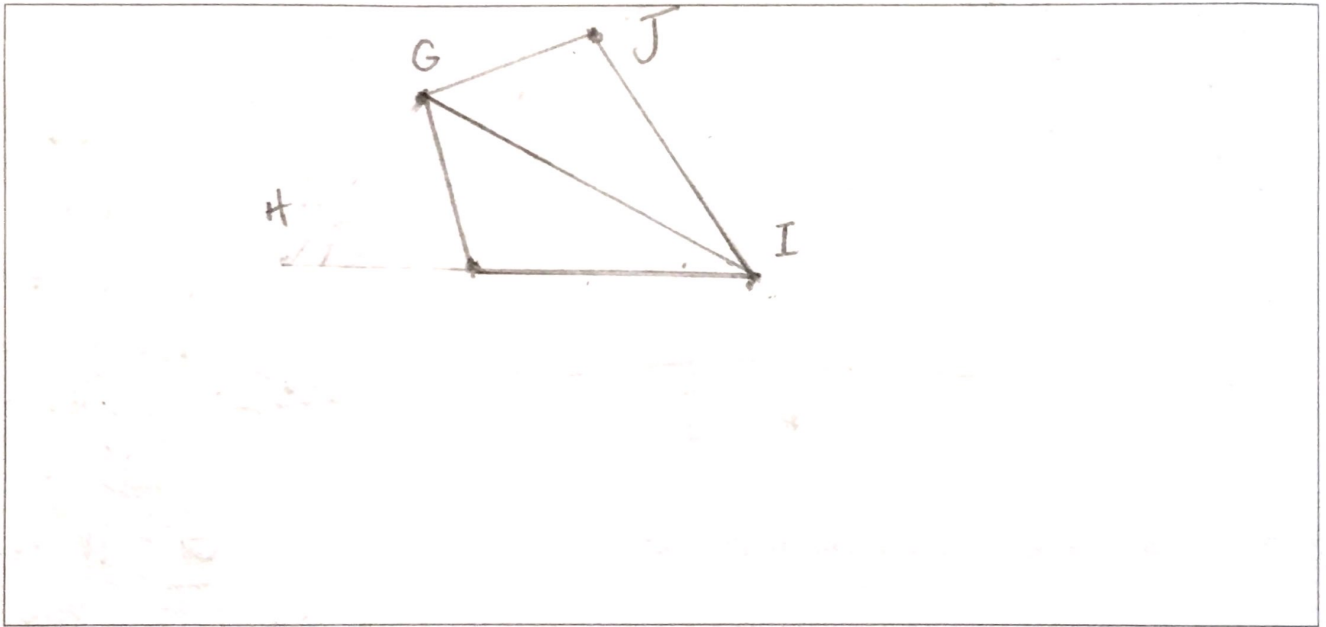
Line \overleftrightarrow{ED} is used to measure the distance of F. Then H is marked at the same distance from the line \overleftrightarrow{ED} , but on the other side. Then I is marked at the same distance of \overleftrightarrow{ED} as point G.

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

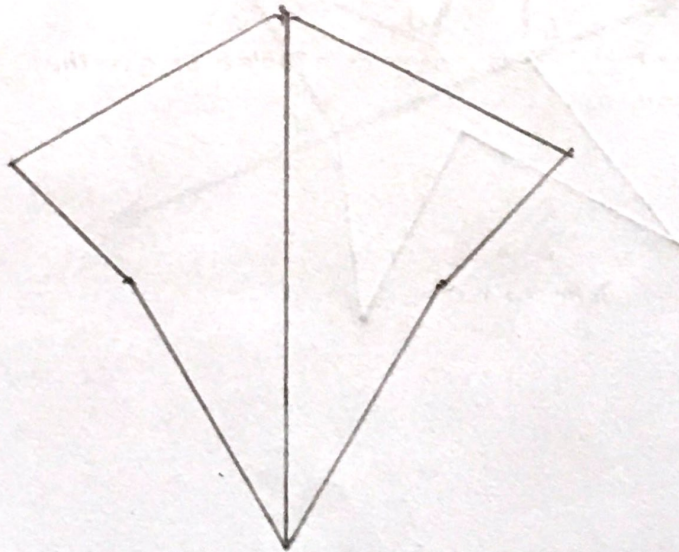


Then the lines \overleftrightarrow{EH} and \overleftrightarrow{DI} are traced.

3. Complete the following construction in the space below.
- Plot 3 non-collinear points, G , H , and I .
 - Draw \overline{GH} , \overline{HI} , and \overrightarrow{IG} .
 - Plot point J , and draw the remaining sides, such that quadrilateral $GHIJ$ is symmetric about \overrightarrow{IG} .



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



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

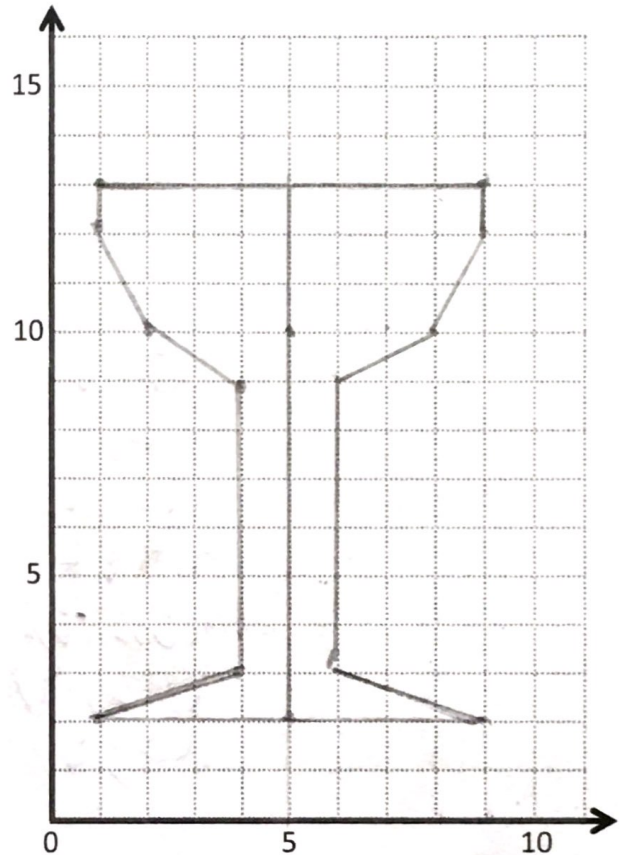
- ✓ a. Draw a line s whose rule is x is always 5.
- b. Plot the points from Table A on the grid in order. Then, draw line segments to connect the points in order.

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)
(10, 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 on table B are the same as in table A. The line of symmetry is vertical, so only the x -coordinates changed.

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

I notice that the difference on each corresponding x coordinate is an even number.

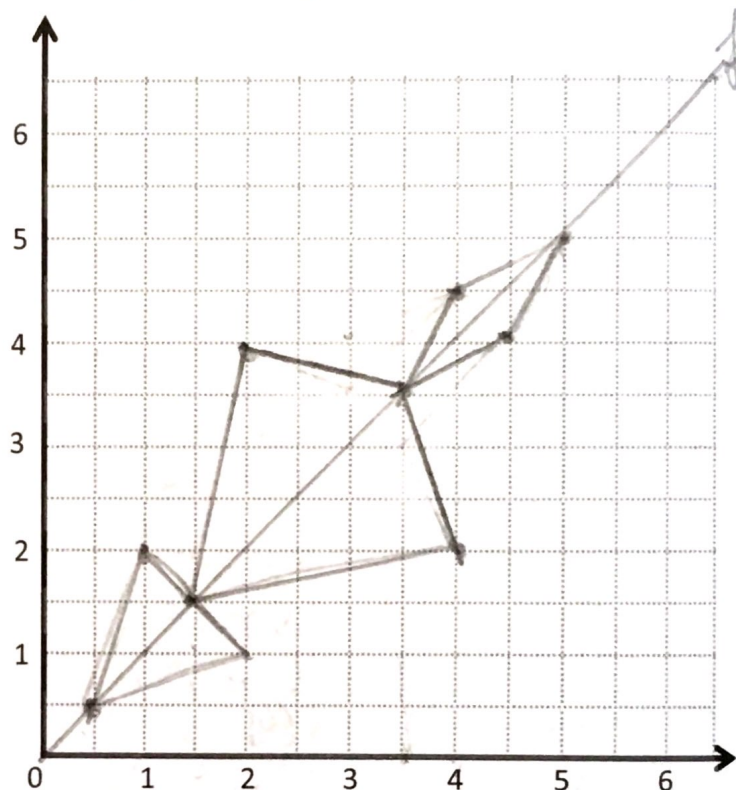
2. Use the plane to the right to complete the following tasks.
- Draw a line p whose rule is, y is equal to x .
 - Plot the points from Table A on the grid in order. Then, draw line segments to connect the points.

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



- Complete the drawing to create a figure that is symmetric about line p . For each point in Table A, record the symmetric point on the other side of the line p in Table B.
- Compare the y -coordinates in Table A with those in Table B. What do you notice?

The y -coordinates switched places with the x -coordinates

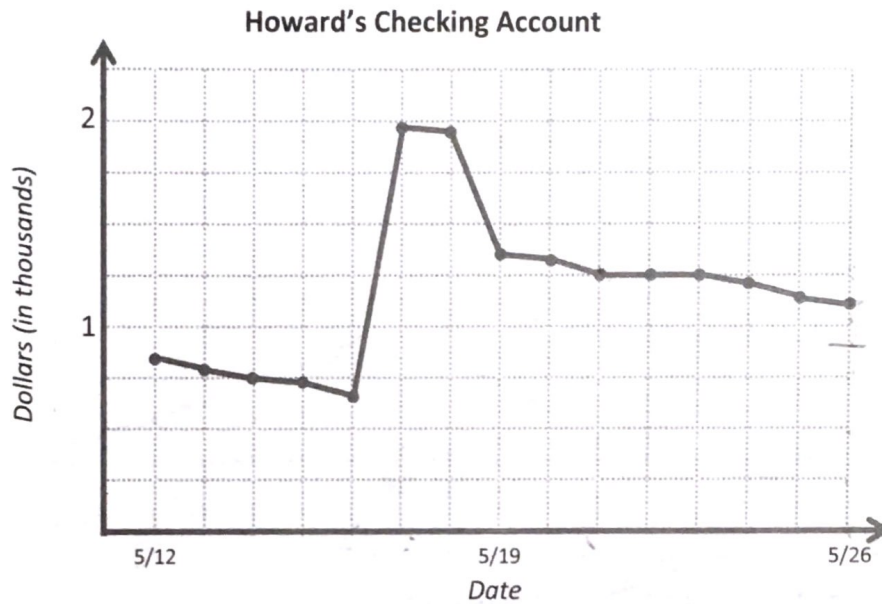
- Compare the x -coordinates in Table A with those in Table B. What do you notice?

The x -coordinates switched places with the x -coordinates

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.



$$\begin{array}{r} 1,129 \\ - 250 \\ \hline 1,870 \end{array}$$

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

Howard had 1,250.

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

He would have 1,870

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

Howard's money remain the same.

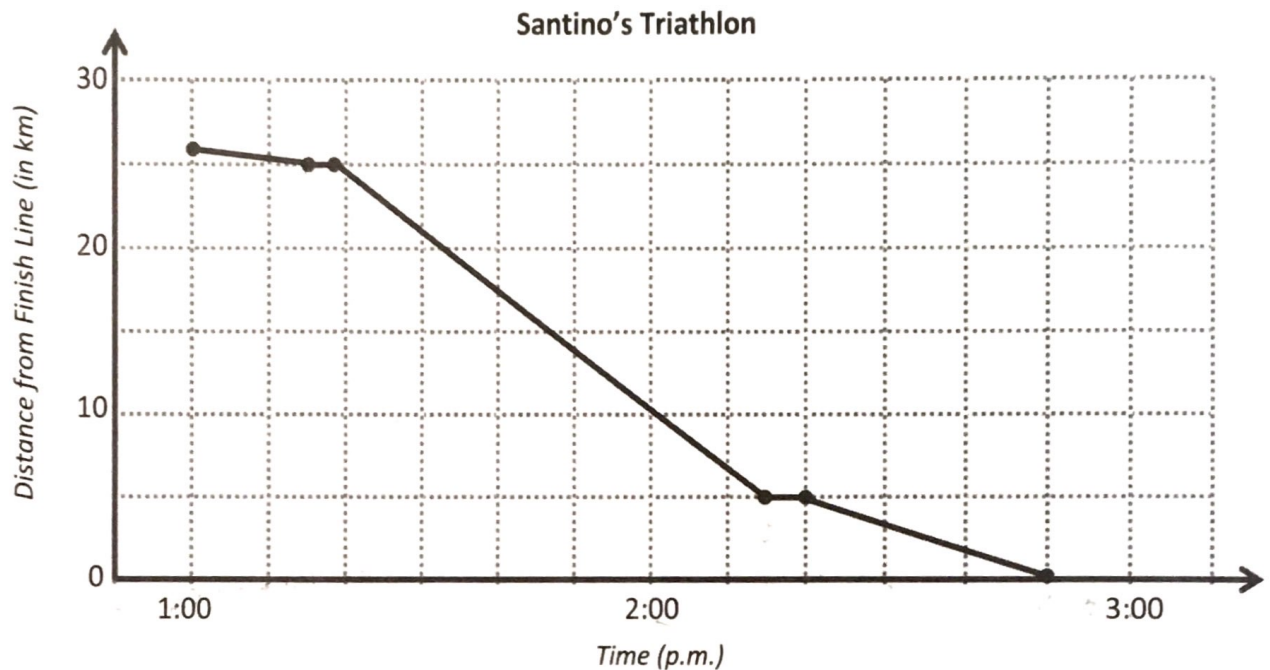
- d. Howard received a payment from his job that went directly into his checking account. On which day did this most likely occur? Explain how you know.

It happen on May 17.

- 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.

Probably it happened on May 19

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?

It takes 1:50 hours

- 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?

The running portion is 5 km.

- 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.

It happened at about 1:15, and the second time happened at about 2:15

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

Santino finishes swimming most quickly.

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

It was less than 20 minutes.
He races most quickly biking.
The line is steep.