MEA 2013-2014
Teacher: Claudia Valle
Start Date:

Course: Geometry A
Student: ________________
Completed Date:

Unit 1: Foundations for Geometry

Objectives: Students will understand and use the basic undefined terms and defined terms of geometry. Students will understand how to measure and describe angles and segments.

Essential Questions: What are some real life situations that represent points, lines, and planes? How can you use measurements to describe, compare, and make sense of real-life objects? How can you best choose the most appropriate measurement technique to use in a situation?

TEKS Standards: G.1.A, G.1.B, G.2.A, G.2.B, G.3.B, G.7.A, G.7.C, G.8.A, G.8.C

Geometry

(1) Geometric structure. The student understands the structure of, and relationships within, an axiomatic system. The student is expected to:

(A) develop an awareness of the structure of a mathematical system, connecting definitions, postulates, logical reasoning, and theorems;

(B) recognize the historical development of geometric systems and know mathematics is developed for a variety of purposes;

(2) Geometric structure. The student analyzes geometric relationships in order to make and verify conjectures. The student is expected to:

(A) use constructions to explore attributes of geometric figures and to make conjectures about geometric relationships; and

(B) make conjectures about angles, lines, polygons, circles, and three-dimensional figures and determine the validity of the conjectures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic.

(3) Geometric structure. The student applies logical reasoning to justify and prove mathematical statements. The student is expected to:

(B) construct and justify statements about geometric figures and their properties;

(7) Dimensionality and the geometry of location. The student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly. The student is expected to:

(A) use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures;

(C) derive and use formulas involving length, slope, and midpoint.

(8) Congruence and the geometry of size. The student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations. The student is expected to:

(A) find areas of regular polygons, circles, and composite figures;

(C) derive, extend, and use the Pythagorean Theorem;

Turn In:

Assignment #	Activity	TEKS
1	Understanding Points, Lines, and Planes	G.1.A,G.7.A
2	Measuring and Constructing Segments	G.2.A, G.2.B, G.3.B, G.7.C
3	Measuring and Constructing Angles	G.1.A, G.1.B, G.2.A, G.2.B, G.3.B
4	Pairs of Angles	G.1.A, G.2.B
5	Midpoint and Distance in the Coordinate Plane	G.1.A, G.7.A, G.7.C, G.8.C
6	Unit 1 Test	G.1.A, G.1.B, G.2.A, G.2.B, G.3.B, G.7.A, G.7.C, G.8.A, G.8.C

Name ______________________ Date ______________ Class ______________

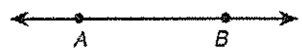
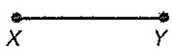
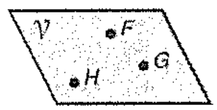
LESSON 1-1

Reteach

Understanding Points, Lines, and Planes

A **point** has no size. It is named using a capital letter.
All the figures below contain points.

•*P*
point *P*

Figure	Characteristics	Diagram	Words and Symbols
line	0 endpoints extends forever in two directions		line *AB* or $\overline{AB}$
line segment or segment	2 endpoints has a finite length		segment *XY* or $\overline{XY}$
ray	1 endpoint extends forever in one direction		*ray RQ* or $\overline{RQ}$ *A ray is named starting with its endpoint.*
plane	extends forever in all directions		plane *FGH* or plane *𝒱*

Draw and label a diagram for each figure.

1. point *W*

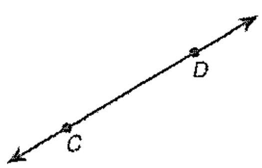
2. line *MN*

3. $\overline{JK}$

4. $\overline{EF}$

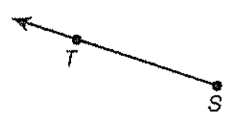
Name each figure using words and symbols.

5.



____

6.



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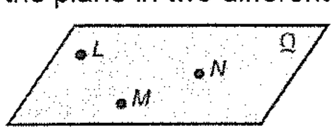
7. Name the plane in two different ways.



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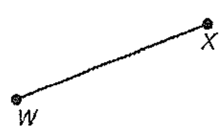
8.



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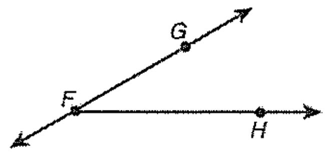
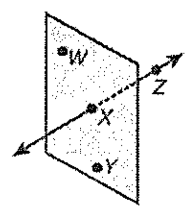
Name ______________________ Date ______________ Class ______________

LESSON 1-1

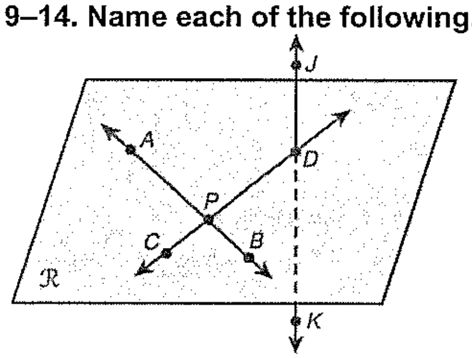
Reteach

Understanding Points, Lines, and Planes continued

Term	Meaning	Model
collinear	points that lie on the same line	 *F* and *G* are collinear. *F*, *G*, and *H* are noncollinear.
noncollinear	points that do not lie on the same line	
coplanar	points or lines that lie in the same plane	 *W*, *X*, and *Y* are coplanar. *W*, *X*, *Y*, and *Z* are noncoplanar.
noncoplanar	points or lines that do not lie in the same plane	

Figures that intersect share a common set of points. In the first model above, $\overleftrightarrow{FH}$ intersects $\overleftrightarrow{FG}$ at point *F*. In the second model, $\overleftrightarrow{XZ}$ intersects plane *WXY* at point *X*.

Use the figure for Exercises 9–14. Name each of the following.



9. three collinear points

____

10. three noncollinear points

____

11. four coplanar points

____

12. four noncoplanar points

____

13. two lines that intersect $\overleftrightarrow{CD}$

____

14. the intersection of $\overleftrightarrow{JK}$ and plane ℛ

____

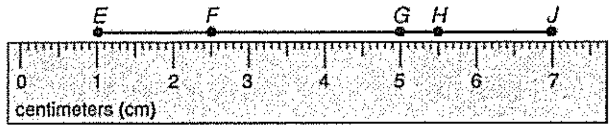
Name ______________________ Date ______________ Class ______________

LESSON 1-2

Reteach

Measuring and Constructing Segments

The **distance** between any two points is the **length** of the segment that connects them.



The distance between E and J is EJ, the length of $\overline{EJ}$. To find the distance, subtract the numbers corresponding to the points and then take the absolute value.

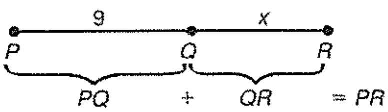
$$EJ = |7 - 1|$$
$$= |6|$$
$$= 6 \text{ cm}$$

Use the figure above to find each length.

1. EG ______________

2. EF ______________

3. FH ______________



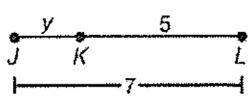
On $\overline{PR}$, Q is between P and R. If $PR = 16$, we can find QR.

$PQ + QR = PR$

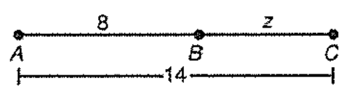
$9 + x = 16$

$x = 7$

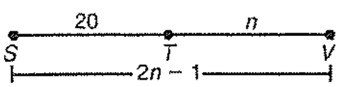
$QR = 7$

4. 

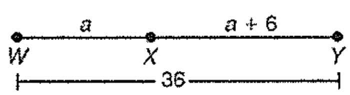
Find JK. ______

5. 

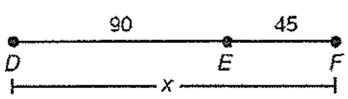
Find BC. ______

6. 

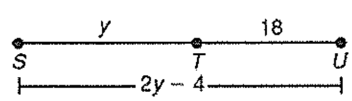
Find SV. ______

7. 

Find XY. ______

8. 

Find DF. ______

9. 

Find ST. ______

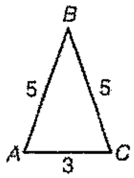
Name ______________________ Date ______________ Class ______________

LESSON 1-2

Reteach

Measuring and Constructing Segments continued

Segments are **congruent** if their lengths are equal.



$AB = BC$ The length of $\overline{AB}$ equals the length of $\overline{BC}$.

$\overline{AB} \cong \overline{BC}$ $\overline{AB}$ is congruent to $\overline{BC}$.

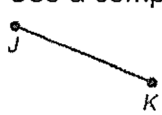
Copying a Segment	
Method	**Steps**
sketch using estimation	Estimate the length of the segment. Sketch a segment that is about the same length.
draw with a ruler	Use a ruler to measure the length of the segment. Use the ruler to draw a segment having the same length.
construct with a compass and straightedge	Draw a line and mark a point on it. Open the compass to the length of the original segment. Mark off a segment on your line at the same length.

Refer to triangle *ABC* above for Exercises 10 and 11.

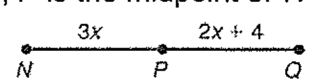
10. Sketch $\overline{LM}$ that is congruent to $\overline{AC}$.

11. Use a ruler to draw $\overline{XY}$ that is congruent to $\overline{BC}$.

12. Use a compass to construct $\overline{ST}$ that is congruent to $\overline{JK}$.



The **midpoint** of a segment separates the segment into two congruent segments. In the figure, *P* is the midpoint of $\overline{NQ}$.



13. $\overline{PQ}$ is congruent to ______________.

14. What is the value of *x*? ______________

15. Find *NP*, *PQ*, and *NQ*. ______________

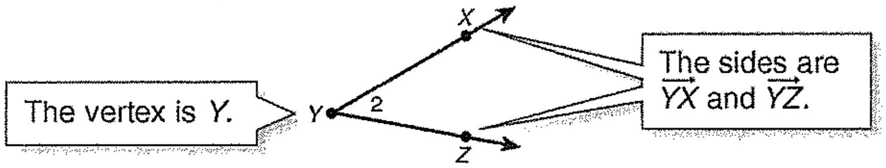
Name ______________________ Date ______________ Class ______________

LESSON 1-3

Reteach

Measuring and Constructing Angles

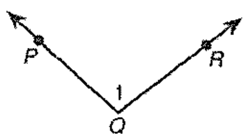
An **angle** is a figure made up of two rays, or **sides,** that have a common endpoint, called the **vertex** of the angle.



There are four ways to name this angle.

∠*Y*	*Use the vertex.*
∠*XYZ* or ∠*ZYX*	*Use the vertex and a point on each side.*
∠2	*Use the number.*

Name each angle in three ways.

1. 

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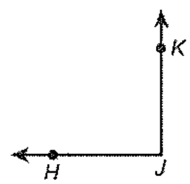
2. 

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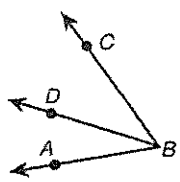
3. Name three different angles in the figure.



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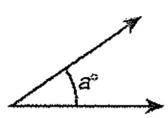
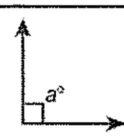
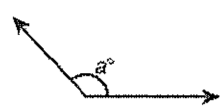
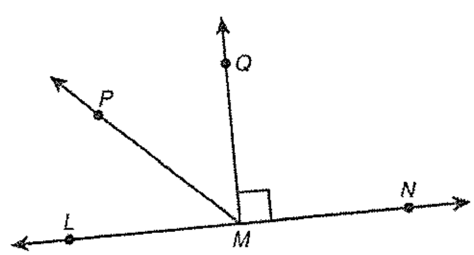
Angle	acute	right	obtuse	straight
Model				
Possible Measures	$0° < a° < 90°$	$a° = 90°$	$90° < a° < 180°$	$a° = 180°$

Classify each angle as acute, right, obtuse, or straight.



4. ∠*NMP*

____

5. ∠*QMN*

____

6. ∠*PMQ*

____

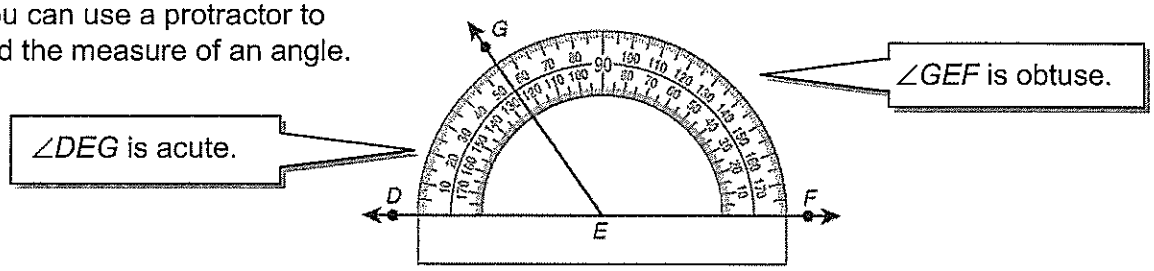
Name ____________________ Date ____________ Class ____________

LESSON 1-3

Reteach

Measuring and Constructing Angles continued

You can use a protractor to find the measure of an angle.



Use the figure above to find the measure of each angle.

7. ∠*DEG* ________

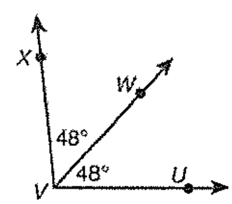
8. ∠*GEF* ________

The measure of ∠*XVU* can be found by adding.

m∠*XVU* = m∠*XVW* + m∠*WVU*

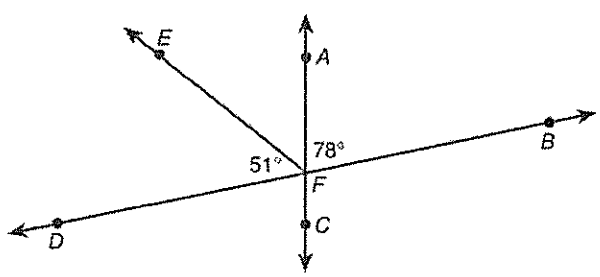
= 48° + 48°

= 96°



Angles are **congruent** if their measures are equal. In the figure, ∠*XVW* ≅ ∠*WVU* because the angles have equal measures. $\overrightarrow{VW}$ is an **angle bisector** of ∠*XVU* because it divides ∠*XVU* into two congruent angles.

Find each angle measure.



9. m∠*CFB* if ∠*AFC* is a straight angle. ________

10. m∠*EFA* if the angle is congruent to ∠*DFE*. ________

11. m∠*EFC* if ∠*DFC* ≅ ∠*AFB*. ________

12. m∠*CFG* if $\overline{FG}$ is an angle bisector of ∠*CFB*. ________

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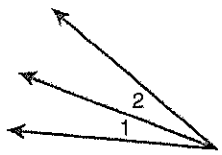
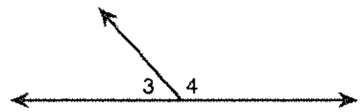
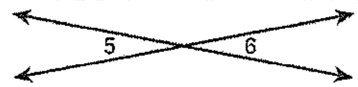
LESSON 1-4

Reteach

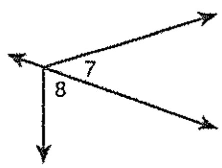
Pairs of Angles

Angle Pairs		
Adjacent Angles	**Linear Pairs**	**Vertical Angles**
have the same vertex and share a common side	adjacent angles whose noncommon sides are opposite rays	nonadjacent angles formed by two intersecting lines
 ∠1 and ∠2 are adjacent.	 ∠3 and ∠4 are adjacent and form a linear pair.	 ∠5 and ∠6 are vertical angles.

Tell whether ∠7 and ∠8 in each figure are only adjacent, are adjacent and form a linear pair, or are not adjacent.

1. 

____

2. 

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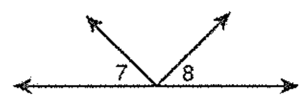
3. 

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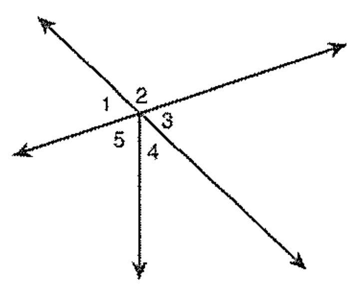
Tell whether the indicated angles are only adjacent, are adjacent and form a linear pair, or are not adjacent.

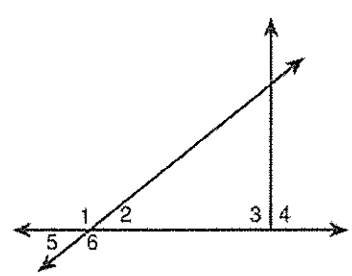


4. ∠5 and ∠4 ______________________

5. ∠1 and ∠4 ______________________

6. ∠2 and ∠3 ______________________

Name each of the following.



7. a pair of vertical angles ______________

8. a linear pair ______________________

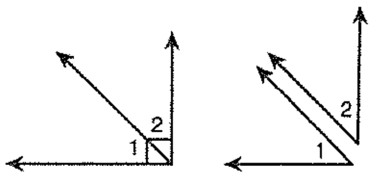
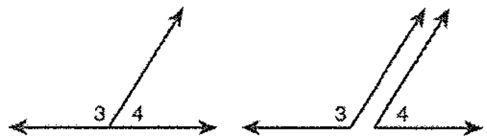
9. an angle adjacent to ∠4 ______________

Name ______________________ Date ______________ Class ______________

LESSON 1-4

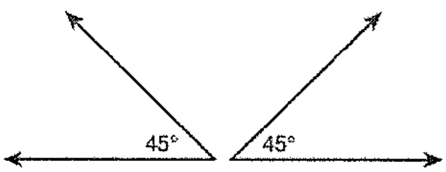
Reteach

Pairs of Angles *continued*

Angle Pairs	
Complementary Angles	**Supplementary Angles**
sum of angle measures is 90°	sum of angle measures is 180°
 $m\angle 1 + m\angle 2 = 90°$ In each pair, $\angle 1$ and $\angle 2$ are complementary.	 $m\angle 3 + m\angle 4 = 180°$ In each pair, $\angle 3$ and $\angle 4$ are supplementary.

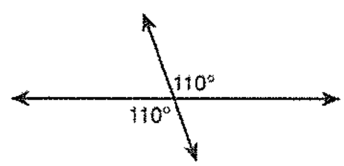
Tell whether each pair of labeled angles is complementary, supplementary, or neither.

10.



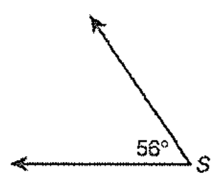
____

11.



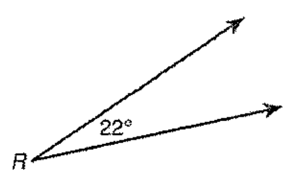
____

Find the measure of each of the following angles.



12. complement of $\angle S$ ______________________

13. supplement of $\angle S$ ______________________



14. complement of $\angle R$ ______________________

15. supplement of $\angle R$ ______________________

16. $\angle LMN$ and $\angle UVW$ are complementary. Find the measure of each angle if $m\angle LMN = (3x + 5)°$ and $m\angle UVW = 2x°$.

____

Name ______________________ Date ____________ Class ____________

LESSON 1-6

Reteach

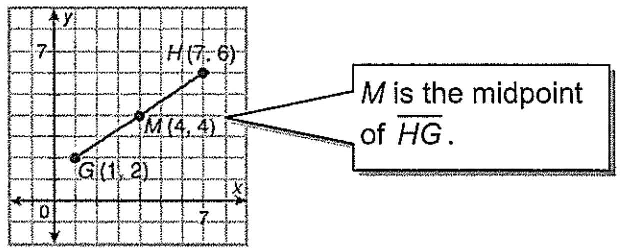
Midpoint and Distance in the Coordinate Plane

The **midpoint** of a line segment separates the segment into two halves. You can use the **Midpoint Formula** to find the midpoint of the segment with endpoints $G(1, 2)$ and $H(7, 6)$.

$$M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) = M\left(\frac{1+7}{2}, \frac{2+6}{2}\right)$$

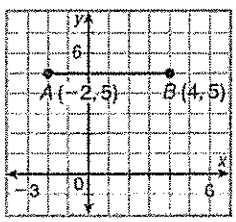
$$= M\left(\frac{8}{2}, \frac{8}{2}\right)$$

$$= M(4, 4)$$



Find the coordinates of the midpoint of each segment.

1.



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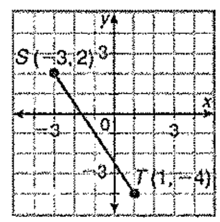

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3. $\overline{QR}$ with endpoints $Q(0, 5)$ and $R(6, 7)$ __________

4. $\overline{JK}$ with endpoints $J(1, -4)$ and $K(9, 3)$ __________

Suppose $M(3, -1)$ is the midpoint of $\overline{CD}$ and C has coordinates (1, 4). You can use the Midpoint Formula to find the coordinates of D.

$$M(3, -1) = M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

<u>*x*-coordinate of *D*</u>		<u>*y*-coordinate of *D*</u>
$3 = \frac{x_1+x_2}{2}$	Set the coordinates equal.	$-1 = \frac{y_1+y_2}{2}$
$3 = \frac{1+x_2}{2}$	Replace (x_1, y_1) with (1, 4).	$-1 = \frac{4+y_2}{2}$
$6 = 1 + x_2$	Multiply both sides by 2.	$-2 = 4 + y_2$
$5 = x_2$	Subtract to solve for x_2 and y_2.	$-6 = y_2$

The coordinates of D are (5, −6).

5. $M(-3, 2)$ is the midpoint of $\overline{RS}$, and R has coordinates (6, 0). What are the coordinates of S? __________

6. $M(7, 1)$ is the midpoint of $\overline{WX}$, and X has coordinates (−1, 5). What are the coordinates of W? __________

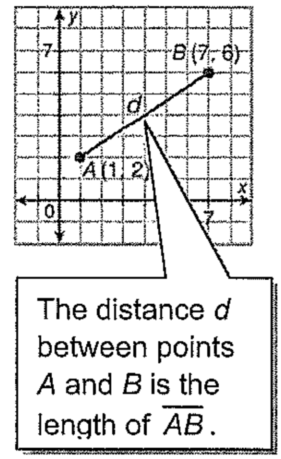
Name ______________________________ Date ______________ Class ______________

LESSON 1-6

Reteach

Midpoint and Distance in the Coordinate Plane continued

The **Distance Formula** can be used to find the distance *d* between points *A* and *B* in the coordinate plane.



$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	
$= \sqrt{(7-1)^2 + (6-2)^2}$	$(x_1, y_1) = (1, 2)$; $(x_2, y_2) = (7, 6)$
$= \sqrt{6^2 + 4^2}$	Subtract.
$= \sqrt{36 + 16}$	Square 6 and 4.
$= \sqrt{52}$	Add.
≈ 7.2	Use a calculator.

Use the Distance Formula to find the length of each segment or the distance between each pair of points. Round to the nearest tenth.

7. $\overline{QR}$ with endpoints $Q(2, 4)$ and $R(-3, 9)$

____

8. $\overline{EF}$ with endpoints $E(-8, 1)$ and $F(1, 1)$

____

9. $T(8, -3)$ and $U(5, 5)$

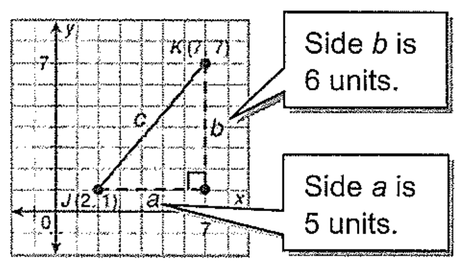
____

10. $N(4, -2)$ and $P(-7, 1)$

____

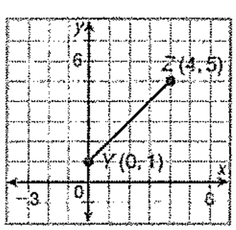
You can also use the Pythagorean Theorem to find distances in the coordinate plane. Find the distance between *J* and *K*.

$c^2 = a^2 + b^2$	Pythagorean Theorem
$= 5^2 + 6^2$	$a = 5$ units and $b = 6$ units
$= 25 + 36$	Square 5 and 6.
$= 61$	Add.
$c = \sqrt{61}$ or about 7.8	Take the square root.



Use the Pythagorean Theorem to find the distance, to the nearest tenth, between each pair of points.

11.



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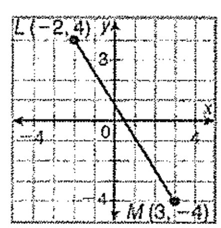

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