Name _____ KEY _____ Date _____ Class _____

Section 1.1 – Introduction Worksheet 1

Understanding Points, Lines, and Planes (undefined terms in geometry)

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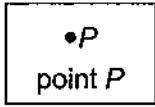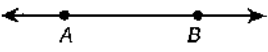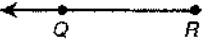All the figures below contain points.

•P
point *P*
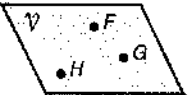
Figure	Characteristics	Diagram	Symbols
line	0 endpoints extends forever in two directions	(line through points A and B)	$\overleftrightarrow{AB}$
line segment or segment	2 endpoints has a finite length	(segment X to Y)	$\overline{XY}$
ray	1 endpoint extends forever in one direction	(ray through Q and R)	$\overrightarrow{RQ}$ *A ray is named starting with its endpoint.*
plane	extends forever in all directions	(plane with points V, F, H, G)	*FGH* (3 or more letters) $\mathcal{V}$ (Capital cursive letter)

Draw and label a diagram for each figure.

1. point *W*   • W

2. $\overrightarrow{MN}$ (line with points M and N)

3. $\overline{JK}$ (segment J to K)

4. $\overline{EF}$ (ray from E through F)
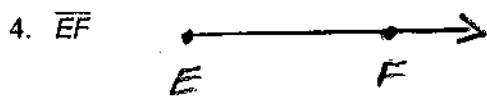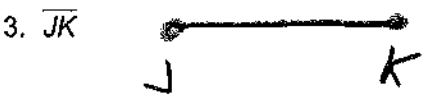
Name each figure using symbols.

5. (line through C and D)   Line CD $\overleftrightarrow{CD}$

6. (ray from S through T)   ray ST   or $\overrightarrow{ST}$
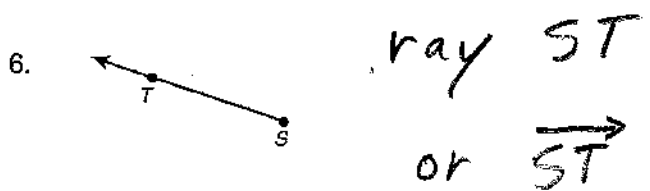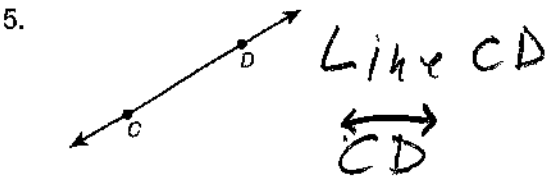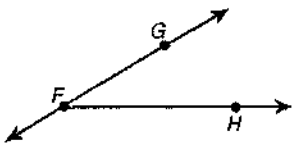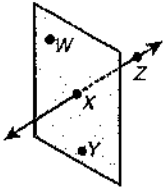
7. Name the plane in two different ways.   (plane with points L, N, M, Q)   Plane LMN   Plane Q

8. (segment W to X)   Segment WX $\overline{WX}$
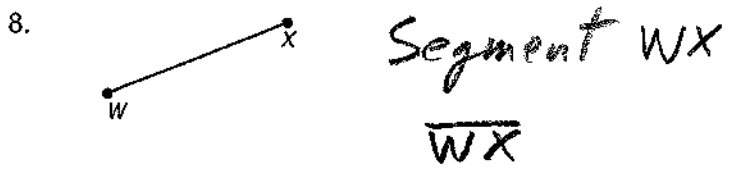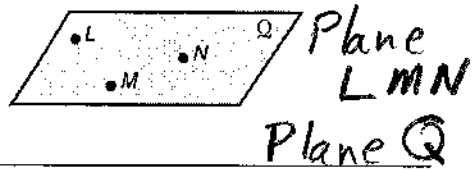
Understanding Points, Lines, and Planes *continued*

Term	Meaning	Model
collinear	points that lie on the same line	
noncollinear	points that do not lie on the same line	F and G are collinear. F, G, and H are noncollinear.
coplanar	points or lines that lie in the same plane	
noncoplanar	points or lines that do not lie in the same plane	W, X, and Y are coplanar. W, X, Y, and Z are noncoplanar. 3 noncollinear points form a plane.

Figures that intersect share a common set of points. In the first model above, $\overline{FH}$ intersects $\overrightarrow{FG}$ 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.
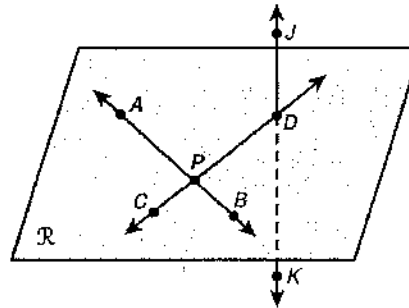
9. three collinear points

A, P, B C, P, D JDK

10. three noncollinear points

A, P, D

11. four coplanar points

$C\ P\ B\ D$

12. four noncoplanar points

J, D, P, B

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

$\overleftrightarrow{AB}$ $\overleftrightarrow{JK}$

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

$Point\ D$ $\bullet D$

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Section 1.1 Worksheet 2

Understanding Points, Lines, and Planes

Fill in the blank with the appropriate vocabulary.

1. Name the points that determine plane *ABC*. __A, B, C__

2. Two points determine one __line__ .

3. Collinear points lie on the same __line__ .

4. Three noncollinear points determine a __plane__ .

5. Coplanar points lie in the same __plane__ .

Answer each question.

6. How are a line and a line segment the same?

__Made up of a string of points; can be named with two points__

7. How are a line and a line segment different?

__Lines conitnue forever in two directions. Segments have 2 endpoints__

8. How are a line segment and a ray the same?

__Both have at least one endpoint. Can be named with 2 points__

9. How are a line segment and a ray different?

__A Ray continues forever in one direction__
__A Segment has 2 end points__

Choose the best answer.

10. In a building, planes *W*, *X*, and *Y* represent each of the three floors; planes *Q* and *R* represent the front and back of the building; planes *S* and *T* represent the sides. Which is a true statement?

   A Planes *W* and *Y* intersect in a line. _Front and side_
   (B) Planes Q and *X* intersect in a line. _Planes marked_
   C Planes *W*, *X* and *T* intersect in a point. _in the corners_
   D Planes *Q*, *R*, and *S* intersect in a point.

11. Suppose point *G* represents a duck flying over a lake, points *H* and *J* represent two ducks swimming on the lake, and plane *Z* represents the lake. Which is a true statement?

   F There are two lines through *G* and *J*.
   G The line containing *G* and *H* lies in plane *Z*
   (H) *G*, *H*, and *J* are noncoplanar.
   J There is exactly one plane containing points *G*, *H*, and *J*.

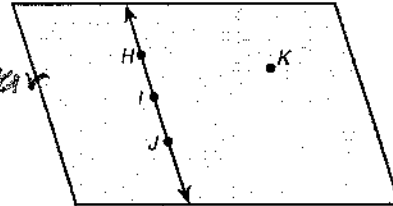Name ___KEY___ Date _____ Class_____

Section 1.1 Worksheet 3

Understanding Points, Lines, and Planes

Use the figure for Exercises 1–3.

1. "This is plane *HIJ*." Explain why this statement is incorrect.
   We must use non-collinear points to name a plane

2. Name the plane.
   H I K   H J K

3. Give six names for the line. $\overrightarrow{HI}$ $\overrightarrow{IH}$ $\overrightarrow{HJ}$ $\overrightarrow{JH}$ $\overrightarrow{IJ}$ $\overrightarrow{JI}$

4. Explain why $\overrightarrow{ST}$ and $\overrightarrow{TS}$ are or are not the same figure.
   They are both rays, but they point in opposite directions

5. Explain why $\overrightarrow{ST}$ and $\overrightarrow{TS}$ are or are not opposite rays.
   They are opposite rays because they point through each other

6. Imagine $\overrightarrow{ST}$ and $\overrightarrow{TS}$ drawn in the same plane. Taken together,
   what kind of figure do the rays form? Line $\overleftrightarrow{ST}$ or $\overleftrightarrow{TS}$

7. Name three undefined terms in geometry. _____

Postulates are basic true statements accepted without proof. Each statement below is incorrect. Rewrite each statement so that it is true.

8. Through any three points there is exactly one plane containing them.
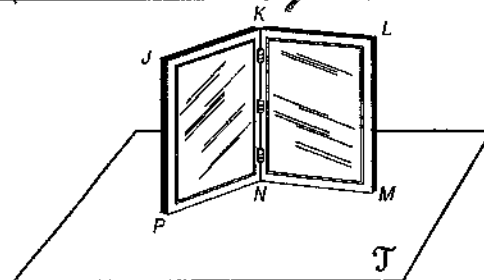   Through any three non-collinear points

9. If two planes intersect, then they intersect in exactly one plane.
   in exactly one line
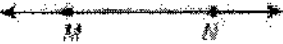
10. A frame holding two pictures sits on a table. Which is NOT a true statement?

    A $\overline{PN}$ and $\overline{NM}$ lie in plane *J*

    B $\overline{PN}$ and $\overline{NM}$ intersect in a point.

    (C) $\overline{LM}$ and *N* intersect in a line.

    D *P* and $\overline{NM}$ are coplanar.

Answers for Section 1.1 Worksheets

Worksheet 1

1. •*W*

2.

3. *J* _____ *K*   4. *E* _____ *F*

5. line *CD* or $\overleftrightarrow{CD}$ 6. ray *ST* or $\overrightarrow{ST}$

7. plane *LMN*; plane *Q*

8. segment *WX*; $\overline{WX}$

9. Possible answers: *A*, *P*, and *B*; *C*, *P*, and *D*; *J*, *D*, and *K*

10. Sample answer: *A*, *P*, and *D*

11. Sample answer: *C*, *P*, *B*, and *D*

12. Sample answer: *J*, *D*, *P*, and *B*

13. $\overline{AB}$ and $\overline{JK}$

14. point *D*

Worksheet 2

1. line   2. line

3. plane   4. plane

5. A line segment is a specific portion of a line that begins and ends.

6. A line goes on forever in both directions, while a segment has endpoints.

7. A ray and a line segment are both parts of a line.

8. A line segment has 2 endpoints. A ray has 1 endpoint and extends forever in one direction.

9. B   10. J

Worksheet 3

1. A plane is named with three noncollinear points. *H*, *I*, and *J* are collinear.

2. Possible answers: plane *HIK*; plane *HJK*; plane *IJK*

3. $\overline{HI}, \overline{HJ}, \overline{IJ}, \overline{IH}, \overline{JH},$ and $\overline{JI}$

4. $\overrightarrow{ST}$ and $\overrightarrow{TS}$ are not the same figure because $\overrightarrow{ST}$ has its endpoint at *S* and $\overrightarrow{TS}$ has its endpoint at *T*.

5. $\overrightarrow{ST}$ and $\overrightarrow{TS}$ are not opposite rays because they do not have the same endpoint.

6. a line   7. point, line, plane

8. Through any three noncollinear points there is exactly one plane containing them.

9. If two planes intersect, then they intersect in exactly one line.

10. C

Worksheet 4