3 Undefined Building Blocks of Geometry

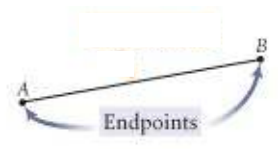| Undefined Term:	Mathematical Model:	Real-World Model:	Naming Conventions:
Point		A tiny seed is a physical model of a point. A point, however, is smaller than any seed that ever existed.	Points are named using capital letters (i.e. point P).
Line		A piece of spaghetti is a physical model of a line. A line, however, is longer, straighter, and thinner than any piece of spaghetti ever made.	Lines are named using two points on the line in either order with a line over the top (i.e. $\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$).
Plane			Planes are named using a single uppercase script letter or three points in the plane (i.e. plane $\mathcal{P}$ or plane DEF).

Mini-Definition:

Term:	Definition:	Picture Model:
Endpoints	Endpoints are the points at which an object starts or ends.	

Collinear	Collinear means on the same line.	 Points A, B, and C are collinear.
Coplanar	Coplanar means on the same plane.	 Points D, E, and F are coplanar.

Picture Examples

Line segment

B

A
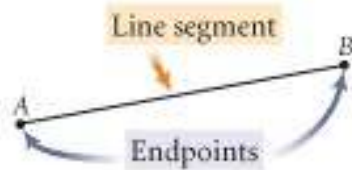
Endpoints

To name line segments, use the endpoints in either order with a line segment over the top (i.e. $\overline{AB}$ or $\overline{BA}$).

Definition

Other Information

A line segment consists of two endpoints and every point between and collinear to the two endpoints.

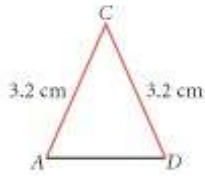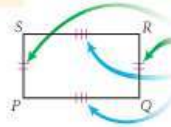Vocabulary Word

Line Segment

To indicate measure of a line segment remove the line segment over the top or use a lowercase m before the line segment name (i.e. AB or $m\overline{AB}$).

When drawing figures, you show congruent segments by making identical markings.

These single marks mean these two segments are congruent to each other.

These double marks mean that $\overline{SP} \cong \overline{RQ}$.

These triple marks mean that $\overline{PQ} \cong \overline{SR}$.

Two segments are congruent if and only if they have equal measures or lengths.

You use "is equal to" with numbers.

$AC = DC$
3.2 cm = 3.2 cm

You use "is congruent to" with figures.

$\overline{AC} \cong \overline{DC}$

Vocabulary Word

Congruent ($\cong$)

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2 cm

2 cm
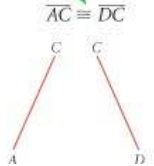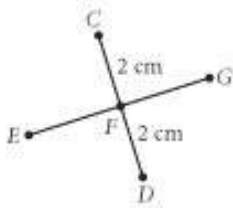
We can say F is the midpoint of $\overline{CD}$ because it is the same distance from C as it is from D.

A midpoint of a line segment is the point that is the same distance from both endpoints. The midpoint of a line segment bisects the line segment, or divides it into two congruent segments.

We can say K bisects $\overline{JL}$ because it divides $\overline{JL}$ into $\overline{JK}$ and $\overline{KL}$, and $\overline{JK} \cong \overline{KL}$.
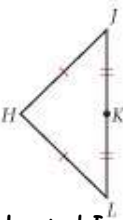
We can not say that H bisects $\overline{JL}$ because J, H, and L are not collinear.

Vocabulary Word

Midpoint
(Bisector of a Line Segment)

Endpoint

Ray AB

A   Y   B

A line that contains a point and all points in one direction from that endpoint.

Rays are named with the endpoint FIRST and any other point on the ray as the second reference point (i.e. $\overrightarrow{AB}$ or $\overrightarrow{AY}$).

Vocabulary Word

Ray

Lesson 1.1 • Building Blocks of Geometry

Name _____ Period _____ Date _____

For Exercises 1–7, complete each statement. $\overline{PS}$ = 3 cm.
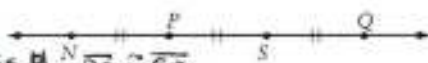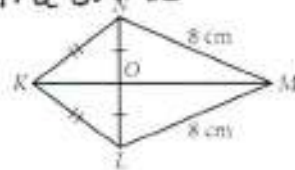
(handwritten, upper right: a number line with points P, S, N, Q)

1. The midpoint of $\overline{PQ}$ is ___**S**___ . We know this 4c $\overline{PS} \cong \overline{SQ}$.

2. NQ = ___**9 cm**___ . The absence of a line over NQ tells us we are being asked for a measurement

3. Another name for $\overline{NS}$ is ___**SN**___ . Line segments are named with the endpoints in either order.

4. S is the ___**endpoint**___ of $\overline{SQ}$.

5. P is the midpoint of ___**NS or SN**___ .

6. $\overline{NS} \cong$ ___**PQ**___ .

7. Another name for $\overrightarrow{SN}$ is ___**SP→**___ . The endpoint of the ray must always remain the same.

8. Name all pairs of congruent segments in KLMN. Use the congruence symbol to write your answer.

$\overline{KN} \cong \overline{KL}$ $\overline{NO} \cong \overline{OL}$ $\overline{NM} \cong \overline{LM}$

(handwritten figure: rhombus K L M N with O in center, 8 cm labels)

9. M(−4, 8) is the midpoint of $\overline{DE}$. D has coordinates (6, 1). Find the coordinates of E.
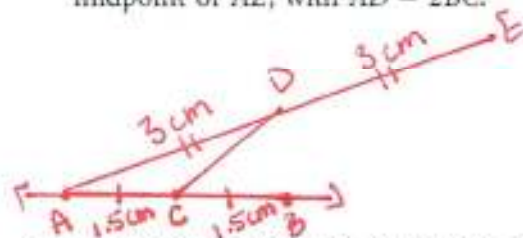
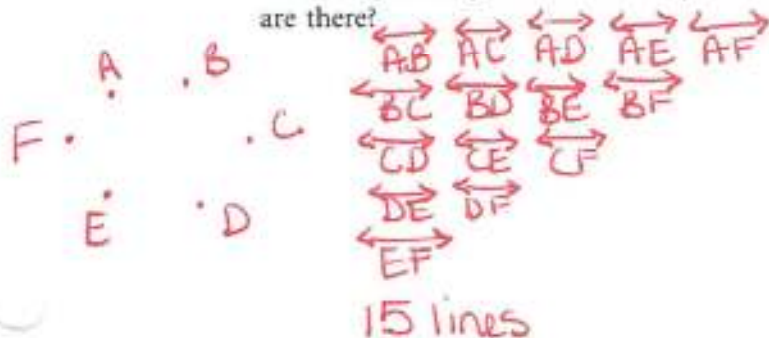For Exercises 10 and 11, use a ruler to draw each figure. Label the figure and mark the congruent parts.

10. $\overline{AB}$ and $\overline{CD}$ with M as the midpoint of both $\overline{AB}$ and $\overline{CD}$. AB = 6.4 cm and CD = 4.0 cm. A, B, and C are not collinear.

(handwritten figure with 3.2 cm, 3.2 cm, 2.0 cm labels, points A, B, C, D, M)
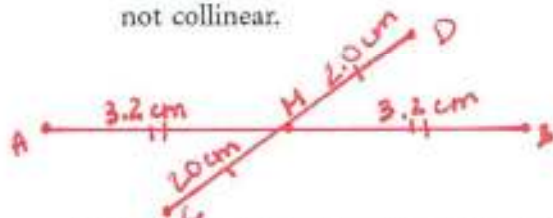
11. $\overline{AB}$ and $\overline{CD}$. C is the midpoint of $\overline{AB}$, with AC = 1.5 cm. D, not on $\overline{AB}$, is the midpoint of $\overline{AE}$, with AD = 2BC.

(handwritten figure with 3 cm, 3 cm, 1.5 cm, 1.5 cm labels, points A, C, B, D, E)

12. Sketch six points A, B, C, D, E, and F, no three of which are collinear. Name the lines defined by these points. How many lines are there?

(handwritten points: A, B, F, C, E, D)

$\overleftrightarrow{AB}$ $\overleftrightarrow{AC}$ $\overleftrightarrow{AD}$ $\overleftrightarrow{AE}$ $\overleftrightarrow{AF}$
$\overleftrightarrow{BC}$ $\overleftrightarrow{BD}$ $\overleftrightarrow{BE}$ $\overleftrightarrow{BF}$
$\overleftrightarrow{CD}$ $\overleftrightarrow{CE}$ $\overleftrightarrow{CF}$
$\overleftrightarrow{DE}$ $\overleftrightarrow{DF}$
$\overleftrightarrow{EF}$

15 lines

13. In the figure below, {B, C, H, E} is a set of four coplanar points. Name two other sets of four coplanar points. How many sets of four coplanar points are there?

12 sets

(handwritten cube with vertices A, B, C, D, E, F, G, H; labeled "Cube")

{C, D, H, G}
{A, B, C, D}
{A, D, H, E}
{A, B, F, E}
{B, F, C, G}
{F, E, H, G}
{F, E, D, C}
{A, B, G, H}
{A, E, C, G}
{A, D, F, G}
{B, F, D, H}