Bellwork

1. $3(x-6)=-12$

2. $3x+5x+12=4x+30$

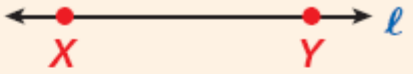
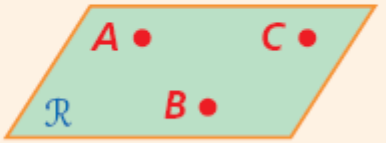
Objectives

Identify, name, and draw points, lines, segments, rays, and planes.

Apply basic facts about points, lines, and planes.

1-1 Understanding Points, Lines, and Planes

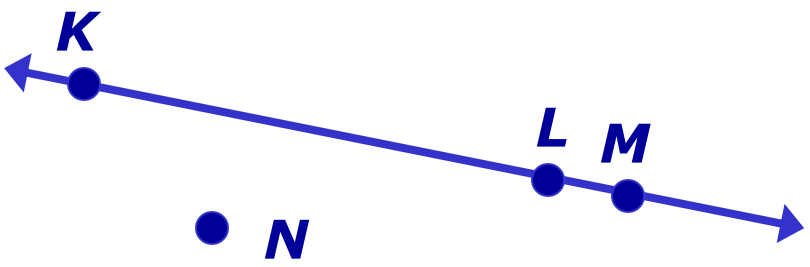
Undefined Terms

TERM	NAME	DIAGRAM
A **point** names a location and has no size. It is represented by a dot.	A capital letter point *P*	
A **line** is a straight path that has no thickness and extends forever.	A lowercase letter or two points on the line line ℓ, $\overleftrightarrow{XY}$ or $\overleftrightarrow{YX}$	
A **plane** is a flat surface that has no thickness and extends forever.	A script capital letter or three points not on a line plane $\mathcal{R}$ or plane *ABC*	

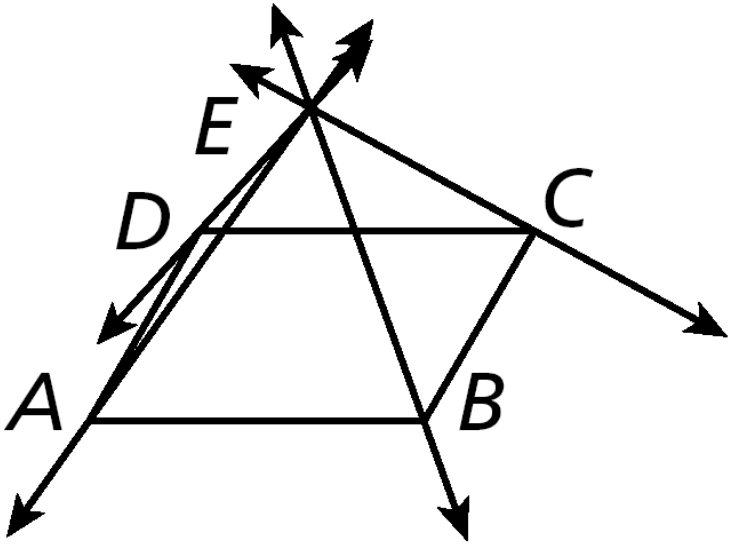
Collinear Points - Points that lie on the same line.

Coplanar Points – Points that lie on the same plane.

Which points below are collinear?



Example 1: Naming Points, Lines, and Planes



A. Name four coplanar points.

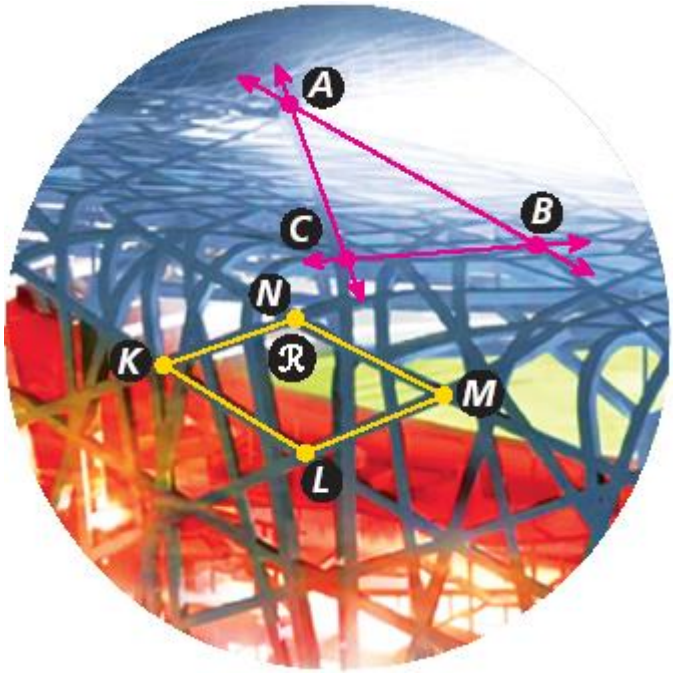
A, B, C, D

B. Name three lines.

Possible answer: $\overleftrightarrow{AE}$, $\overleftrightarrow{BE}$, $\overleftrightarrow{CE}$

Check It Out! Example 1

Use the diagram to name two planes.

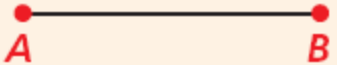
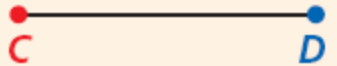


Possible answer:

Plane $\mathcal{R}$ and plane *ABC.*

1-1 Understanding Points, Lines, and Planes

Segments and Rays

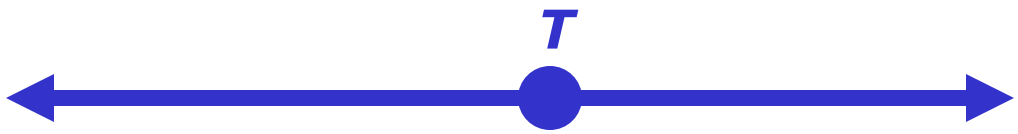
DEFINITION	NAME	DIAGRAM
A **segment**, or line segment, is the part of a line consisting of two points and all points between them.	The two endpoints $\overline{AB}$ or $\overline{BA}$	
An **endpoint** is a point at one end of a segment or the starting point of a *ray*.	A capital letter C and D	
A **ray** is a part of a line that starts at an endpoint and extends forever in one direction.	Its endpoint and any other point on the ray $\overrightarrow{RS}$	
Opposite rays are two rays that have a common endpoint and form a line.	The common endpoint and any other point on each ray $\overrightarrow{EF}$ and $\overrightarrow{EG}$	

Example 2: Drawing Segments and Rays

Draw and label each of the following.

A. a segment with endpoints *M* and *N*.

B. opposite rays with a common endpoint *T*.



Check It Out! Example 2

Draw and label a ray with endpoint *M* that contains *N*.

A **postulate**, or *axiom*, is a statement that is accepted as true without proof. Postulates about points, lines, and planes help describe geometric properties.

1-1 Understanding Points, Lines, and Planes

Postulates **Points, Lines, and Planes**

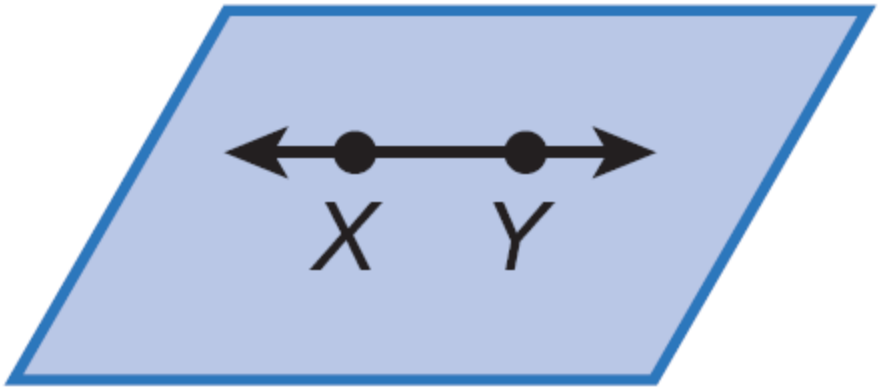
1-1-1 Through any two points there is exactly one line.

1-1-2 Through any three noncollinear points there is exactly one plane containing them.

1-1-3 If two points lie in a plane, then the line containing those points lies in the plane.

Example 3: Identifying Points and Lines in a Plane

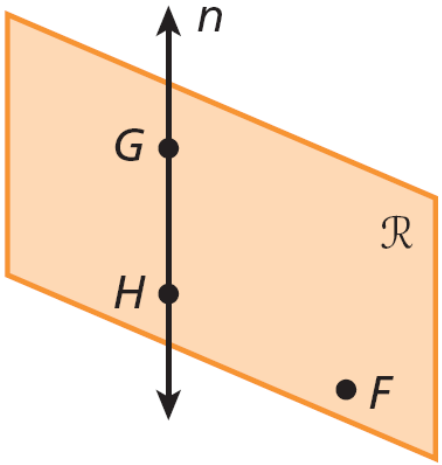
Name a line that passes through two points.



$\overleftrightarrow{XY}$

Check It Out! Example 3

Name a plane that contains three noncollinear points.



Possible answer: plane *GHF*

Recall that a system of equations is a set of two or more equations containing two or more of the same variables. The coordinates of the solution of the system satisfy all equations in the system. These coordinates also locate the point where all the graphs of the equations in the system *intersect*.

An intersection is the set of all points that two or more figures have in common. The next two postulates describe intersections involving lines and planes.

In Class:

Page 9 # 1 – 10