

1-1 Understanding Points, Lines, and Planes

Bellwork

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

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

1-1 Understanding Points, Lines, and Planes


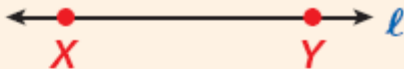

Objectives

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

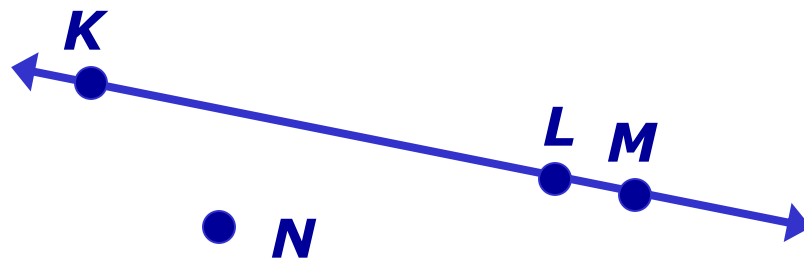
TERM	NAME	DIAGRAM
A point names a location and has no size. It is represented by a dot.	A capital letter point P	
A line is a straight path that has no thickness and extends forever.	A lowercase letter or two points on the line line ℓ , \overleftrightarrow{XY} or \overleftrightarrow{YX}	
A plane is a 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	

1-1 Understanding Points, Lines, and Planes

Collinear Points - Points that lie on the same line.

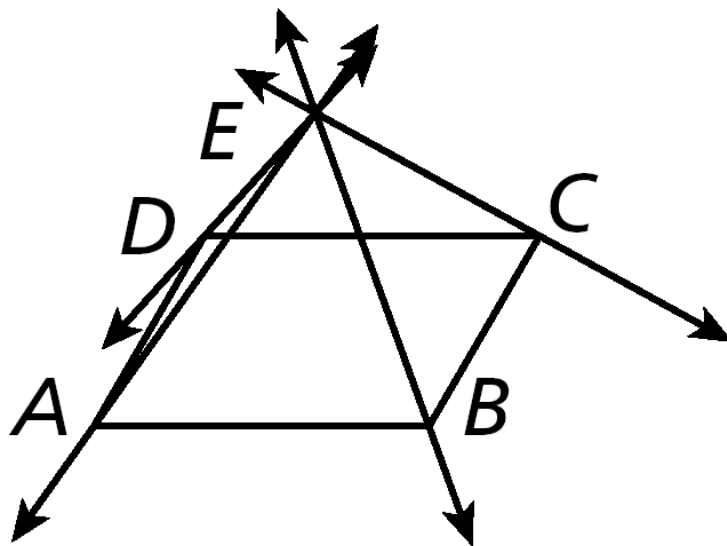
Coplanar Points - Points that lie on the same plane.

Which points below are collinear?



1-1 Understanding Points, Lines, and Planes

Example 1: Naming Points, Lines, and Planes



A. Name four coplanar points.

A, B, C, D

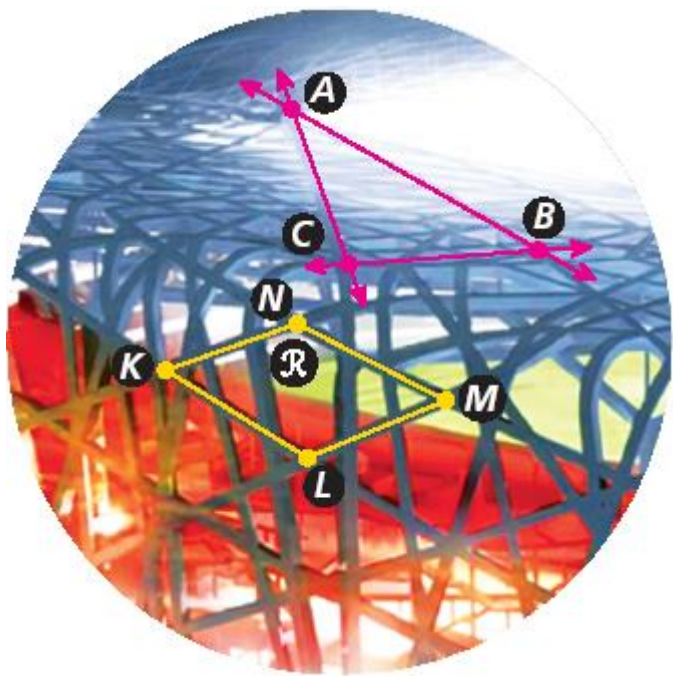
B. Name three lines.

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

1-1 Understanding Points, Lines, and Planes

Check It Out! Example 1

Use the diagram to name two planes.

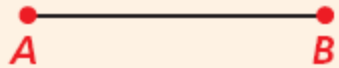
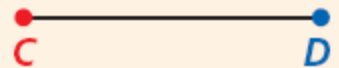




Possible answer:

Plane 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}	

1-1 Understanding Points, Lines, and Planes

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 .



1-1 Understanding Points, Lines, and Planes

Check It Out! Example 2

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



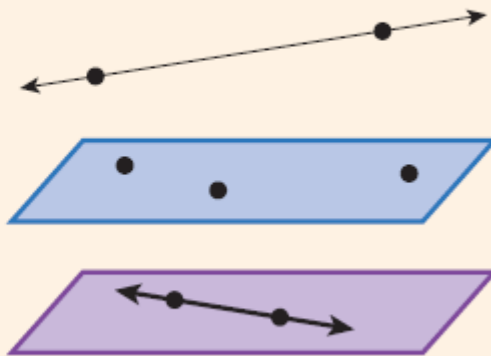
1-1 Understanding Points, Lines, and Planes

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

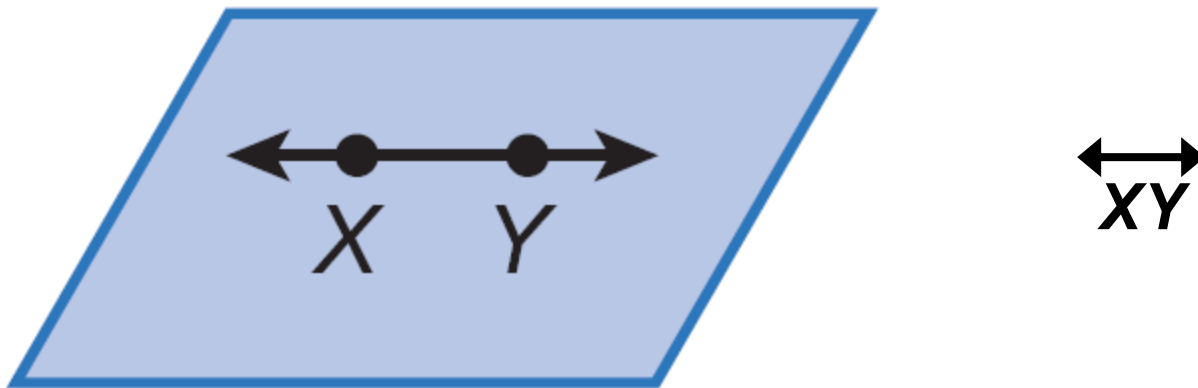
- 1-1-1** Through any two points there is exactly one line.
- 1-1-2** Through any three noncollinear points there is exactly one plane containing them.
- 1-1-3** If two points lie in a plane, then the line containing those points lies in the plane.



1-1 Understanding Points, Lines, and Planes

Example 3: Identifying Points and Lines in a Plane

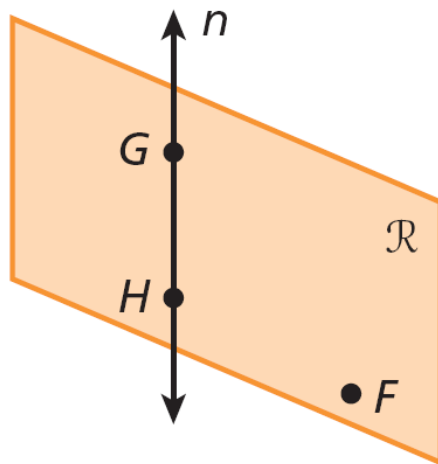
Name a line that passes through two points.



1-1 Understanding Points, Lines, and Planes

Check It Out! Example 3

Name a plane that contains three noncollinear points.



Possible answer: plane GHF

1-1 Understanding Points, Lines, and Planes

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.

1-1 Understanding Points, Lines, and Planes

Page 9 # 3-10, 13-19