

# 1.1 Points, Lines, and Planes



# Objectives:

- Understand and use the basic undefined terms and defined terms of geometry.
- Sketch the intersections of lines and planes.

# Undefined Terms

A *definition* uses known words to describe a new word.

In geometry, some words such as point, line, and plane are *undefined* terms. In other words, there is no formal definition for these words, but instead they are explained by using examples and descriptions which allows us to define other geometric terms and properties.

# Example of what your note page should look like now

Date	1.1 Points, Lines, & Planes
Objectives:	<ol style="list-style-type: none"><li>1. undefined terms of geometry</li><li>2. intersections of lines &amp; planes</li></ol>
Notes:	Point, line and plane are undefined terms
Assignment:	

# Point

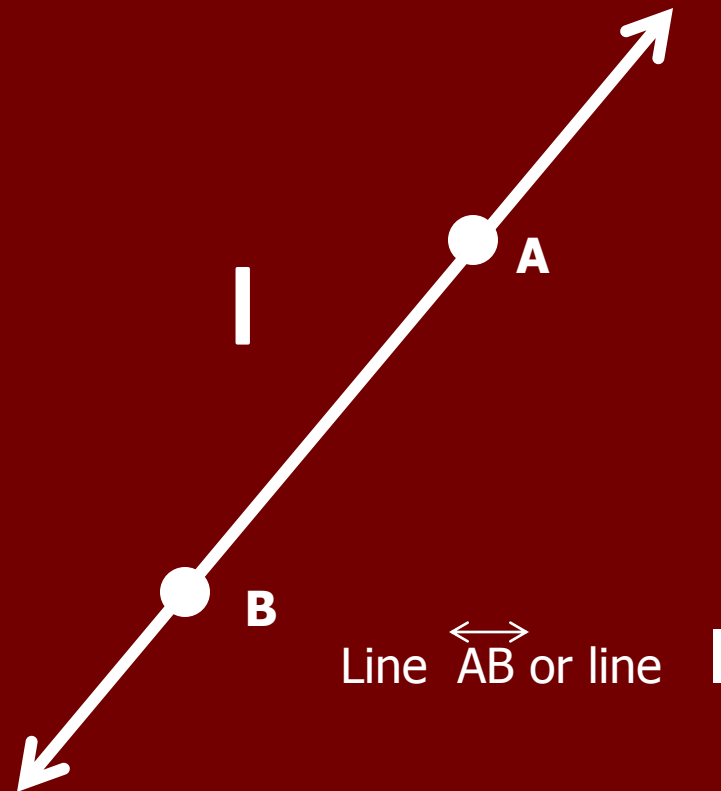
- A ***point*** is simply a location. It has no dimension (shape or size), is usually represented by a small dot, and named by a capital letter.

A ●

Point A

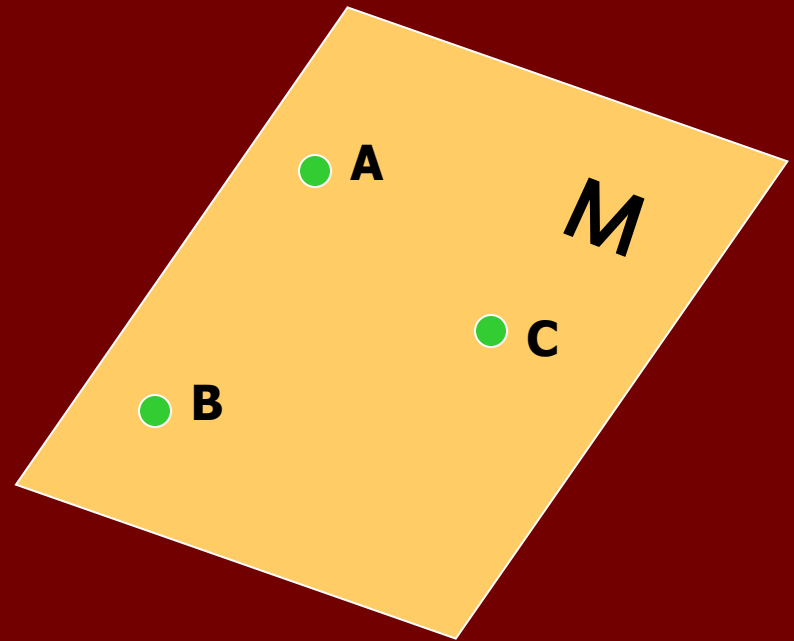
# Line

- A **line** is a set of points and extends in one dimension. It has no thickness or width, is usually represented by a straight line with two arrowheads to indicate that it extends without end in both directions, and is named by two points on the line or a lowercase script letter.



# Plane

- A plane is a flat surface made up of points. It extends in two dimensions, is usually represented by a shape that looks like a tabletop or wall, and is named by a capital script letter or 3 non-collinear points. You must imagine that the plane extends without end, even though the drawing of a plane appears to have edges.



Plane ABC or plane M

# Space

- *Space* is a boundless, three dimensional set of all points. It can contain points, lines, and planes.



# A few more basic concepts using these undefined terms . . .

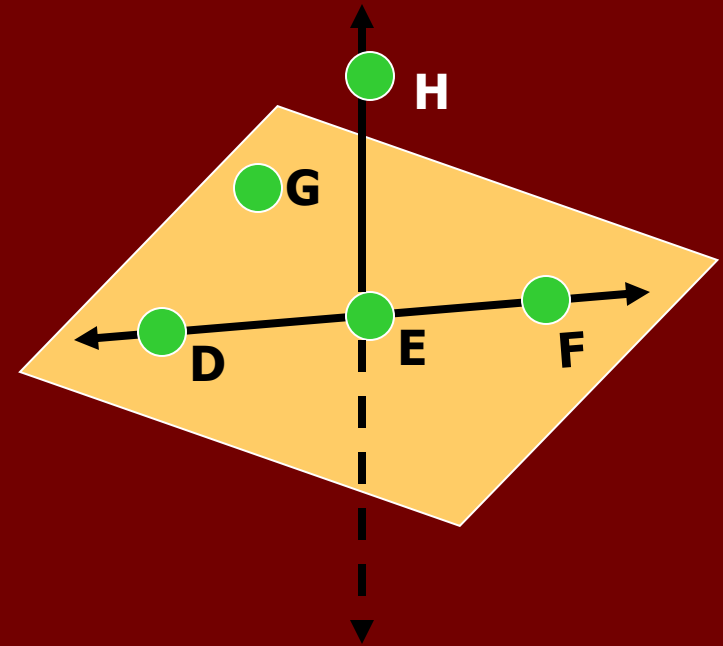
- *Collinear points* are points that lie on the same line.
- *Coplanar points* are points that lie on the same plane.

# Example 1:

Name three points that are collinear

Solution:

D, E and F lie on the same line, so they are collinear.

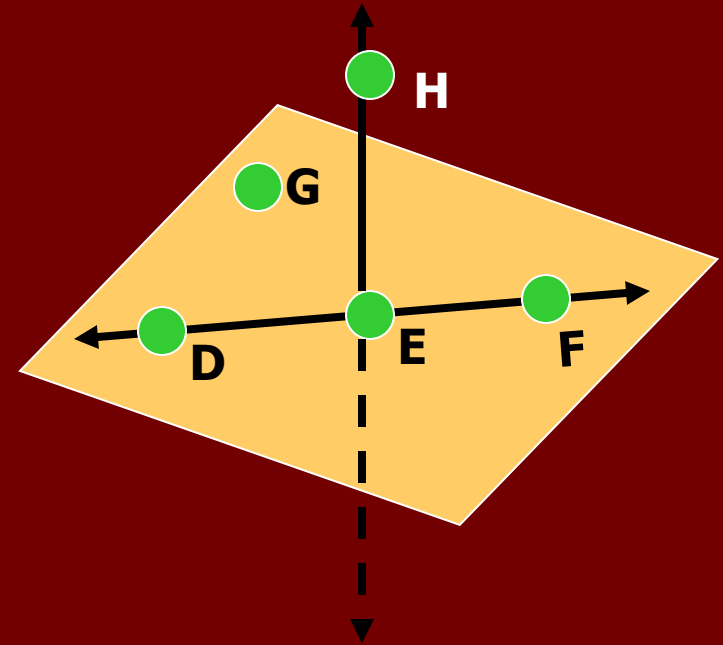


## Example 2:

Name four points that are coplanar.

Solution:

D, E, F, and G lie on the same plane, so they are coplanar. Also D, E, F, and H are coplanar; although, the plane containing them is not drawn.

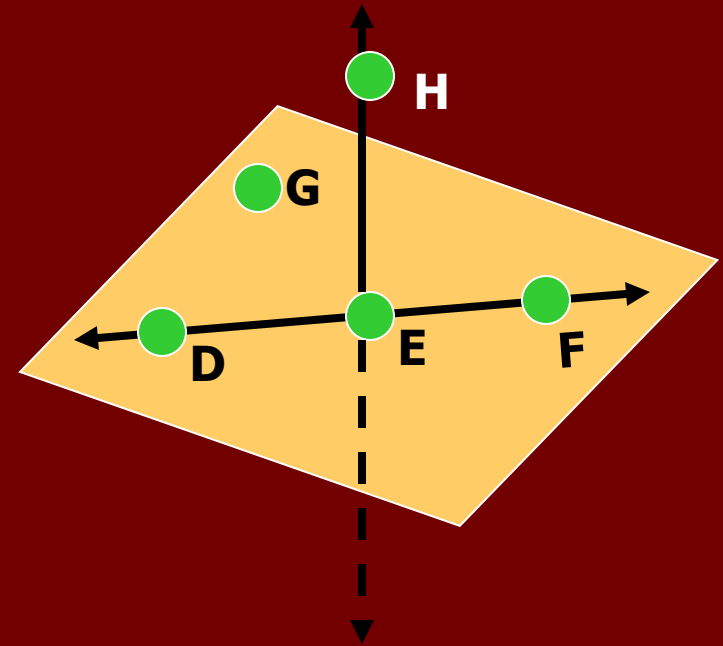


# Example 3:

Name three points that are not collinear.

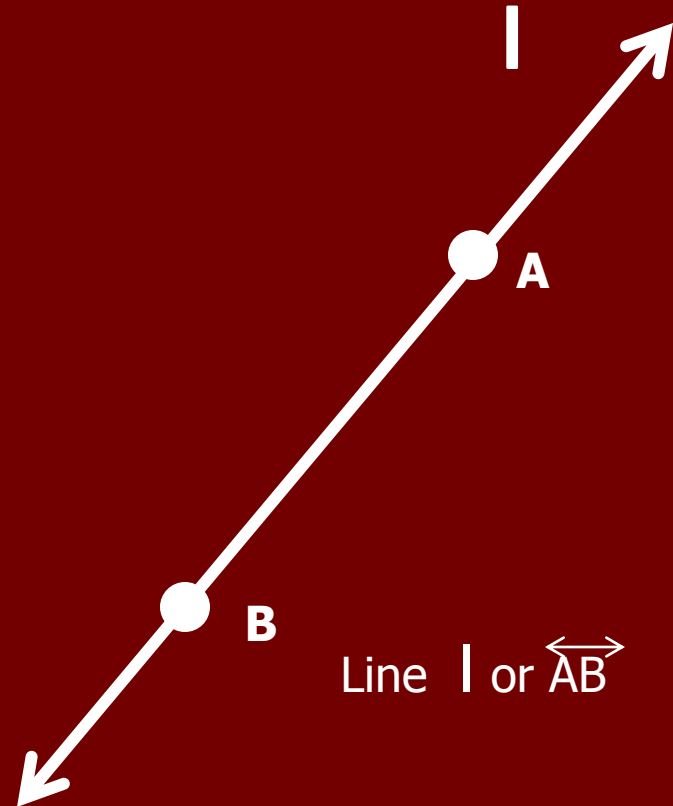
Solution:

There are many correct answers. For instance, points H, E, and G do not lie on the same line.



# More . . .

- Another undefined concept in geometry is the idea that a point on a line is between two other points on the line. You can use this idea to define other important terms in geometry.
- Consider the line  $AB$  (symbolized by  $\overleftrightarrow{AB}$ ).

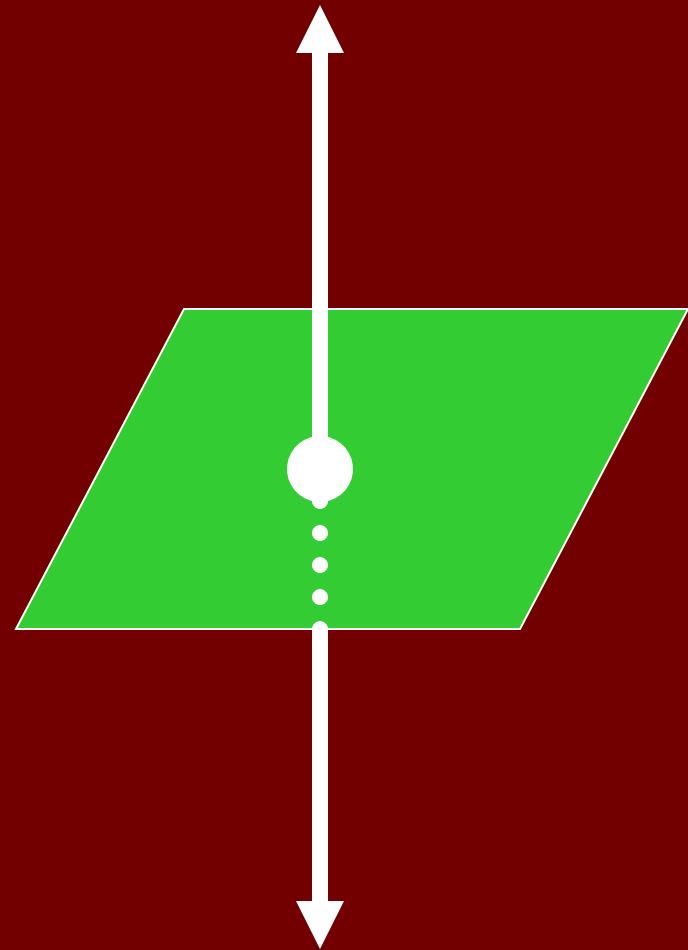


# Intersections of Lines & Planes

- Two or more lines *intersect* if they have a common point. Two or more planes *intersect* if they have a common line. The intersection of any figures is the set of points the figures have in common.

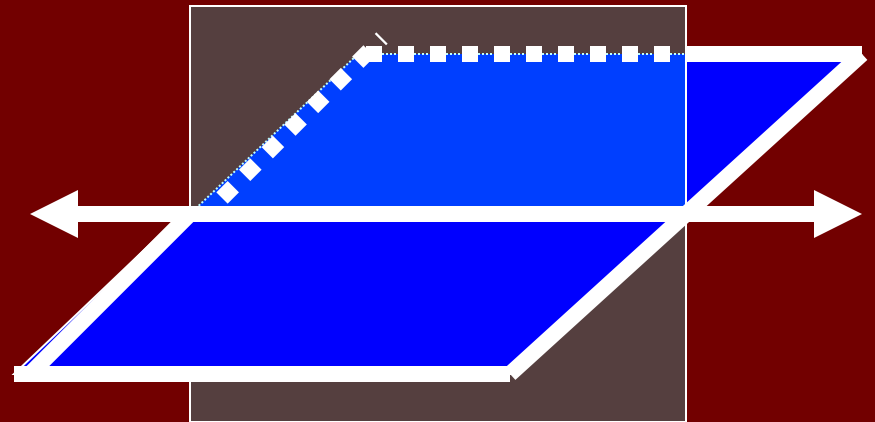
# Example 4:

- How to sketch a line that intersects a plane in one point
- Draw a plane and a line.
- Emphasize the point where they meet.
- Use dashes to indicate where the line is hidden by the plane.



# Example 5:

- How to sketch two planes that intersect in a line.
  - Draw two planes.
  - Emphasize the line where they meet.
  - Use dashes to indicate where one plane is hidden by the other plane.





# Assignment:

## ■ Geometry

Pg. 9 – 10 #13 – 26, 30 – 35, 41 - 46