

Tools of Geometry Unit

1-2 Points, Lines, Planes

Undefined or Defined Term	Diagram	Name
<p>point undefined term</p> <p>-a location in space, but has no size</p>		A
<p>line undefined term</p> <p>-a straight infinite path in two opposite directions, but it has no thickness.</p>		\overleftrightarrow{AB}
<p>plane undefined term</p> <p>-a flat surface that extends infinitely, but it has no thickness.</p>		P
<p>segment</p> <p>-a piece of a line.</p>		\overline{AB}
<p>ray</p> <p>-a piece of a line that begins at an endpoint and extends forever in one direction.</p>		\overrightarrow{AB}
<p>opposite rays</p> <p>-otherwise known as a line.</p>		$\overrightarrow{CA}, \overrightarrow{CB}$

Collinear - points that lie on the same line

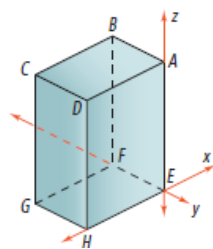
Coplanar - points and lines that lie on the same plane

Postulate (Axiom) - an accepted statement of fact

Through any two points, there is exactly one line.

Through any three non-collinear points, there is exactly one plane.

See if you can match the items below?



Column A

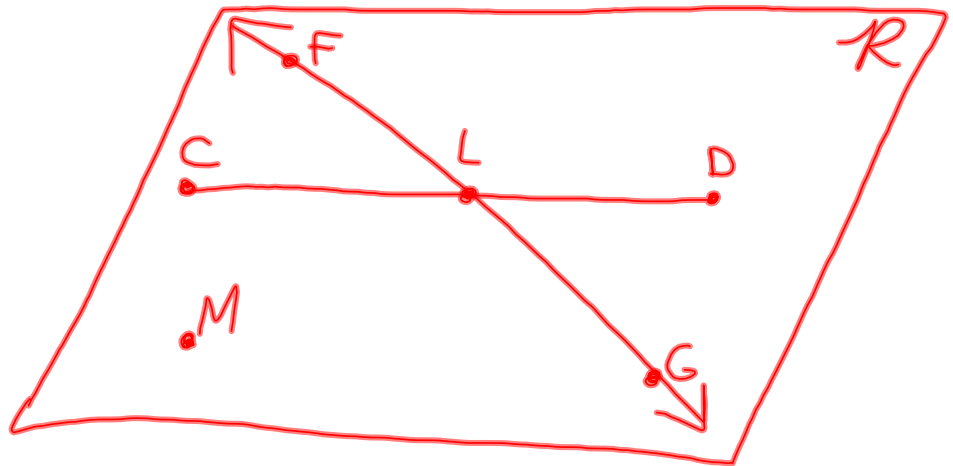
- plane HGE
- \overline{BF}
- plane DAE
- line y
- point A

Column B

- intersection of \overleftrightarrow{AB} and line z
- plane AEH
- line through points F and E
- intersection of planes ABF and CGF
- plane containing points $E, F,$ and G

Let's practice with the basics of geometry!

- point
- line
- plane
- segment
- ray
- opposite rays
- collinear
- coplanar



1-6 Basic Constructions

Constructions - a geometric figure drawn using a straightedge and a compass

You will need to be able to make the following constructions:

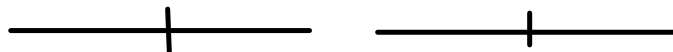
congruent segment
perpendicular bisector
angle bisector

1-3 Measuring Segments

Congruent - exactly the same size and shape

- symbol \cong

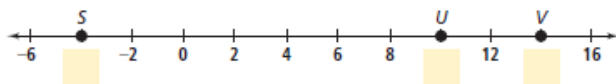
How to Mark Segments Congruent



Coordinate - the location of a point

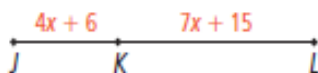
Distance - taking the absolute value of the difference of two points

- find the distance between S and U below



Segment Addition Postulate - If \overline{TU} and \overline{UV} are adjacent segments, then $TU + UV = TV$.

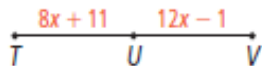
In the diagram, $JL = 120$. What are JK and KL ?



Midpoint - the point that divides the segment into two congruent segments

Bisector - something that divides a segment or angle in half

U is the midpoint of \overline{TV} . What are TU , UV , and TV ?



1-4 Measuring Angles

Vocabulary - Angle, Vertex, Angle Types (Acute, Right, Obtuse, Straight), Angle Addition Postulate

Angles -

Definition

An angle is formed by two rays with the same endpoint.

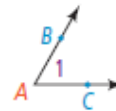
The rays are the **sides** of the angle. The endpoint is the **vertex** of the angle.

How to Name It

You can name an angle by **its vertex** IF there is only one angle to be named!!!!

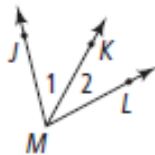
- a point on each ray and the vertex
- a number

Diagram

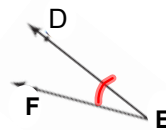
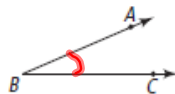


Naming Angles

What are two other names for $\angle KML$?



How to Mark Angles Congruent

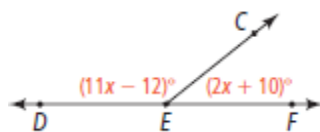


Angle Addition Postulate - If



, then $m\angle JMK + m\angle MKL = m\angle JML$.

$\angle DEF$ is a straight angle. What are $m\angle DEC$ and $m\angle CEF$?

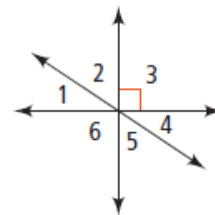


1-5 Exploring Angle Pairs

Angle Pair	Definition
Adjacent angles	Two coplanar angles with a common side, a common vertex, and no common interior points
Vertical angles	Two angles whose sides are opposite rays
Complementary angles	Two angles whose measures have a sum of 90
Supplementary angles	Two angles whose measures have a sum of 180

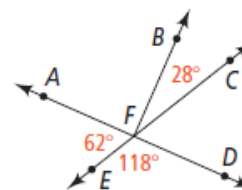
Draw a line from each word in Column A to the angles it describes in Column B.

- | Column A | Column B |
|-------------------|---------------------------|
| 10. supplementary | $\angle 1$ and $\angle 2$ |
| 11. adjacent | $\angle 2$ and $\angle 3$ |
| 12. vertical | $\angle 2$ and $\angle 5$ |
| 13. complementary | $\angle 3$ and $\angle 6$ |



Got It? Use the diagram at the right. Are $\angle AFE$ and $\angle CFD$ vertical angles? Explain.

14. The rays of $\angle AFE$ are \overrightarrow{FE} and $\overrightarrow{FC} / \overrightarrow{FA}$.
15. The rays of $\angle CFD$ are \overrightarrow{FC} and $\overrightarrow{FD} / \overrightarrow{FA}$.



Complete each statement.

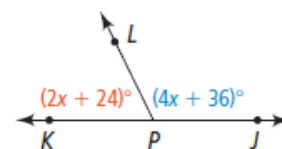
16. \overrightarrow{FE} and are opposite rays.
17. \overrightarrow{FA} and are opposite rays.
18. Are $\angle AFE$ and $\angle CFD$ vertical angles?

Take note **Postulate 1-9 Linear Pair Postulate**

If two angles form a linear pair, then they are supplementary.

21. If $\angle A$ and $\angle B$ form a linear pair, then $m\angle A + m\angle B = \text{$.

Got It? Reasoning $\angle KPL$ and $\angle JPL$ are a linear pair, $m\angle KPL = 2x + 24$, and $m\angle JPL = 4x + 36$. How can you check that $m\angle KPL = 64$ and $m\angle JPL = 116$?



1-7 Midpoints and Distance Formula

Midpoint

Definition: A *midpoint* of a segment is a point that divides the segment into two congruent segments.

On a Number Line	In the Coordinate Plane
The coordinate of the midpoint M of \overline{AB} with endpoints at a and b is $\frac{a+b}{2}$.	Given $A(x_1, y_1)$ and $B(x_2, y_2)$, the coordinates of the midpoint of \overline{AB} are $M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

Find the midpoint on a number line of a segment that has -3 and 5 as endpoints.

Got It? The midpoint of \overline{AB} has coordinates $(4, -9)$. Endpoint A has coordinates $(-3, -5)$. What are the coordinates of B ?

Distance

take note

Formula The Distance Formula

The distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ is $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

Got It? \overline{SR} has endpoints $S(-2, 14)$ and $R(3, -1)$. What is SR to the nearest tenth?