# Geometry B Live Lesson Class

## U1L2 – Review of the Tools of Geometry

CONNECTIONS ACADEMY®

# Agenda

1. Review topics from Unit 1, Lessons 2.

2. Use the 2-column note system to take better notes in math class. Bring your math notebook and pen or pencil to each math LiveLesson class.

# 2-Column Notes Template

1. Announcements/To Do's

2. School-Wide Learner Outcomes

3. LL Objectives

4. Vocabulary words

5. Problems

6. Summary (End of class)

1. Write down important details.

2. What are you going to work on this week?

4. Definitions (fill in as we go)

5. Steps to solving problems

6. 1 or 2 sentences about the LL class.

# Reminders and To – Do's

| Information | What to do |
|---|---|
| 1. Complete 1 math lesson per day. | 1. Go to your Planner in Connexus to find the math lesson for the day |
| 2. Check your WebMail every day | 2. Go to Connexus to find WebMail |
| 3. Be prepared to spend 4 - 6 hours per day on schoolwork. | 3. Complete lessons for the day from your Planner. Do not get behind on lessons. |
| 4. Remind your Learning Coach to take daily attendance | 4. Have your Learning Coach log into Connexus daily. |

# Reminders and To – Do's

### Information

### What to do

5. Go to the Message Board first for information about our math class.

6. Contact Mr. Elizondo for math questions.

6. Call (559) 549 - 3244 and leave a voicemail if call is not answered.

Remember: You need at least 2 phone calls with Mr. Elizondo per semester.

Make an appointment at: https://elizondo.youcanbook.me

Send a WebMail

# California Common Core State Standards

- HSG-CO.A.1: Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

- HSG-CO.C.9: Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

- HSG-CO.D.12: Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

- HSG-GPE.B.4: Use coordinates to prove simple geometric theorems algebraically.

- HSG-GPE.B.7: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

- HSN-Q.A.1: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

# U1L2 – Objectives

- Make nets and drawings of three-dimensional figures.

- Understand basic terms and postulates of geometry.

- Find and compare lengths of segments

- Find and compare the measures of angles

- Identify special angle pairs and use their relationships to find angle measures.

- Make basic constructions using a straightedge and a compass

- Find the midpoint of a segment.

- Find the distance between two points in the coordinate plane

- Find the perimeter or circumference of basic shapes

- Find the area of basic shapes

# U1L2 - Net

A **net** is a two-dimensional figure (2-D) that can be folded to form a three-dimensional (3-D) figure
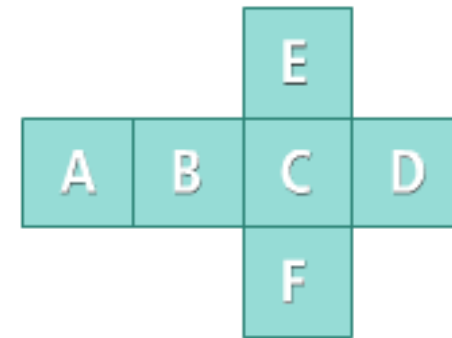
# U1L2 – Isometric drawing

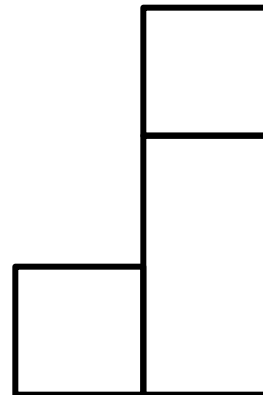An **isometric drawing** shows a corner view.
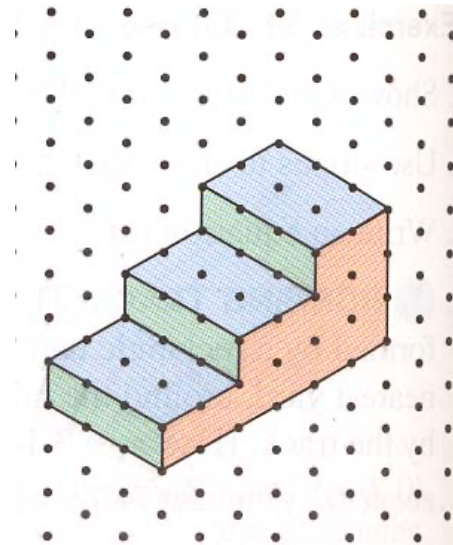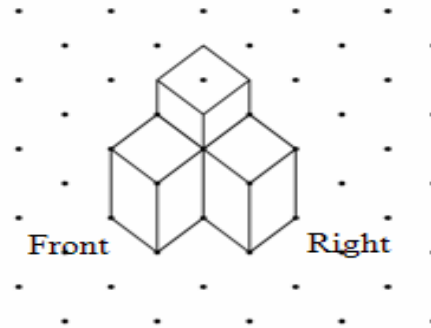
An **orthographic drawing** shows three separate views: a top view, a front view and a right side view.
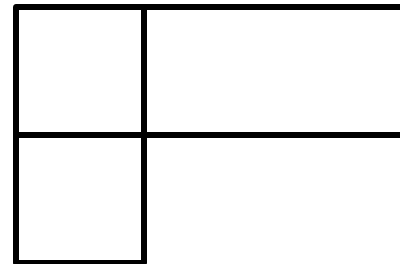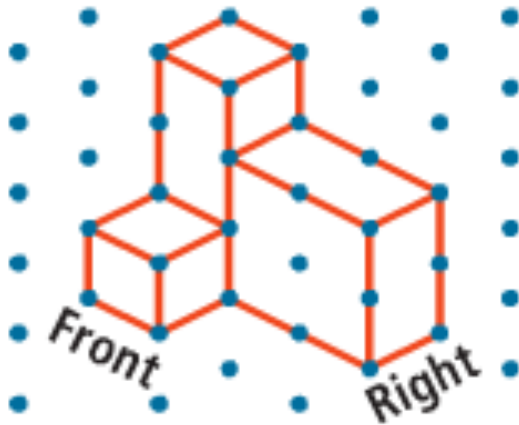


top
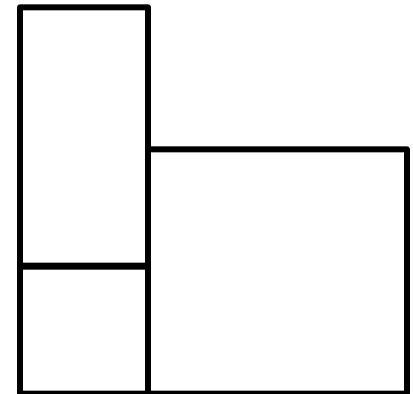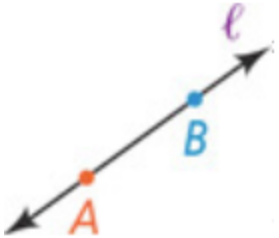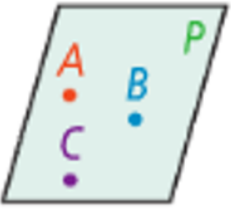
front

right-side

# U1L2 – Undefined Terms

| Term | Naming | Diagram |
|---|---|---|
| A **point** indicates a location and has no size. | M<br>Point M |  |
| A **line** is represented by a straight path that extends in two opposite directions without end. It has no thickness. A line contains infinitely many points. | $AB$<br>Line AB<br>Line $l$ |  |
| A **plane** is represented by a flat surface that extends without end. It has no thickness. A plane contains infinitely many lines. | Plane P<br>Plane ABC (you must use 3 **noncollinear** points) |  |

# U1L2 – Points on a plane

**Collinear** points are points that lie on the same line.

Points and lines that lie in the same plane are **coplanar**.

**Space** is the set of all points in three dimensions.

# U1L2 – Defined Terms

| Term | Naming | Diagram |
|---|---|---|
| A **segment** is a part of a line that consists of two endpoints and all points between them. | $\overline{AB}$<br>$\overline{BA}$<br>Segment AB |  |
| A **ray** is a part of a line that consists of one endpoint and all the points of the line on one side of the endpoint. | $\overrightarrow{AB}$<br>Ray AB |  |
| **Opposite rays** are two rays that share the same endpoint and form a line. | $\overrightarrow{CA}$ and $\overrightarrow{CB}$ |  |

# U1L2 – Postulate, axiom

A **postulate** or **axiom** is an accepted statement of fact.

These are the building blocks of logic and reasoning in geometry

# U1L2 – Two Points through a straight line

## Postulate 1-1

Through any two points there is exactly one line.

Line *t* passes through points *A* and *B*. Line *t* is the only line that passes through both points.
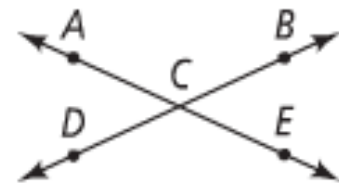
**take note**

## Postulate 1-2

If two distinct lines intersect, then they intersect in exactly one point.

$\overleftrightarrow{AE}$ and $\overleftrightarrow{DB}$ intersect in point $C$.

# U1L2 – Intersecting Planes

## Postulate 1-3

If two distinct planes intersect, then they intersect in exactly one line.

Plane *RST* and plane *WST* intersect in $\overleftrightarrow{ST}$.
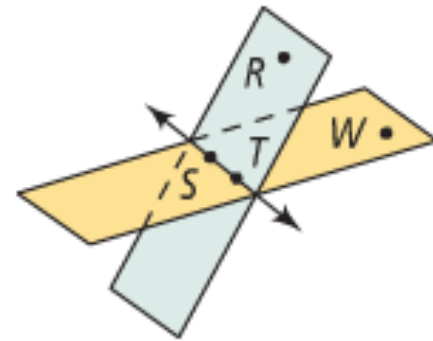
# U1L2 – Key Words - Segments

- The **midpoint** of a segment is a point that divides the segment into two congruent segments.

- A point, line, ray, or other segment that intersects a segment at its midpoint is said to bisect the segment. That point, line, ray, or segment is called a **segment bisector**.
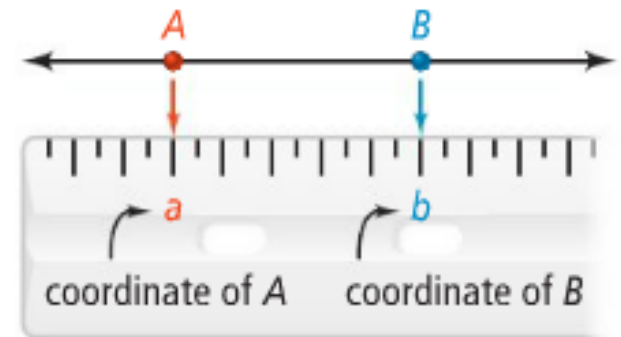


$B$ is the midpoint of $\overline{AC}$.

$\ell$ is a segment bisector of $\overline{AC}$.
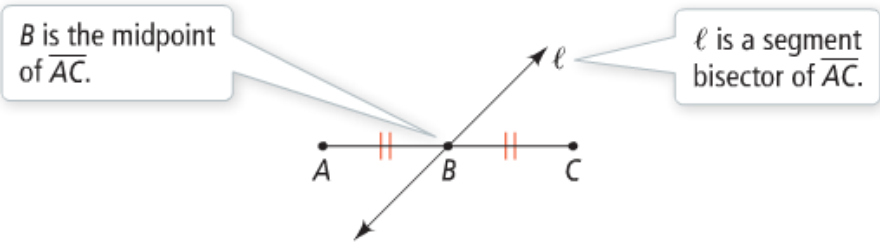
# U1L2 – Ruler Postulate

## Postulate 1-5  Ruler Postulate

Every point on a line can be paired with a real number. This makes a one-to-one correspondence between the points on the line and the real numbers. The real number that corresponds to a point is called the **coordinate** of the point.

# U1L2 – Key Words - Segments

- The distance between points A and B is the absolute value of the difference of their coordinates.
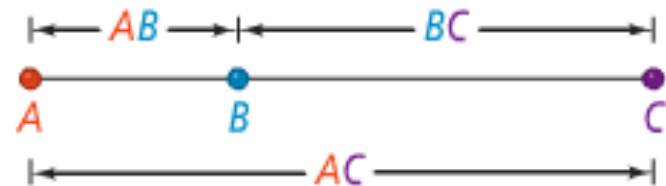
- Distances cannot be negative



$$AB = |a - b|$$
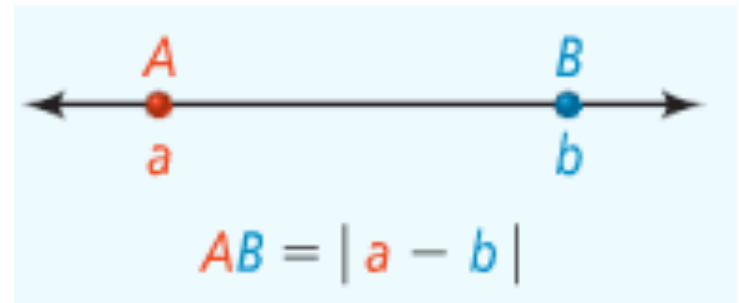
# U1L2 - Segment Addition Postulate

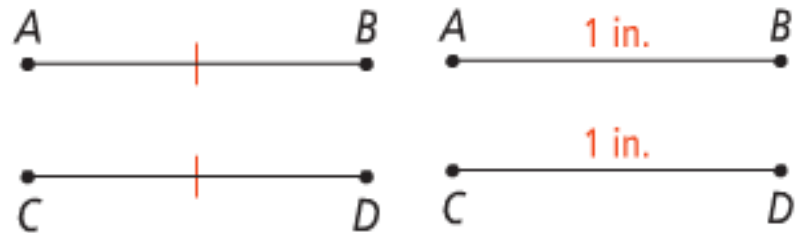**Postulate 1-6    Segment Addition Postulate**

If three points $A$, $B$, and $C$ are collinear and $B$ is between $A$ and $C$, then $AB + BC = AC$.

# U1L2 – Segments

- **Congruent segments** are segments that have the same length.



$$\overline{AB} \cong \overline{CD} \quad \text{means} \quad AB = CD$$

$$AB = CD \quad \text{means} \quad \overline{AB} \cong \overline{CD}$$

# U1L2 – Key Words - Angles

## take note

### Key Concept   Angle

**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, $\angle A$
- a point on each ray and the vertex, $\angle BAC$ or $\angle CAB$
- a number, $\angle 1$

**Diagram**
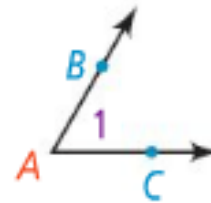
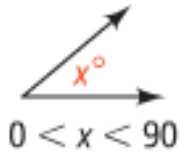The sides of the angle are $\overrightarrow{AB}$ and $\overrightarrow{AC}$.
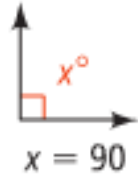The vertex is $A$.

# U1L2 – Key Words - Angles

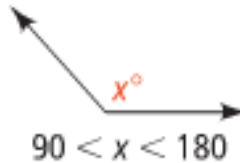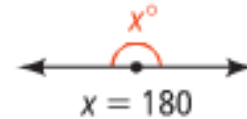**Key Concept** **Types of Angles**

**acute angle**

$x°$

$0 < x < 90$

**right angle**

$x°$

$x = 90$

**obtuse angle**

$x°$
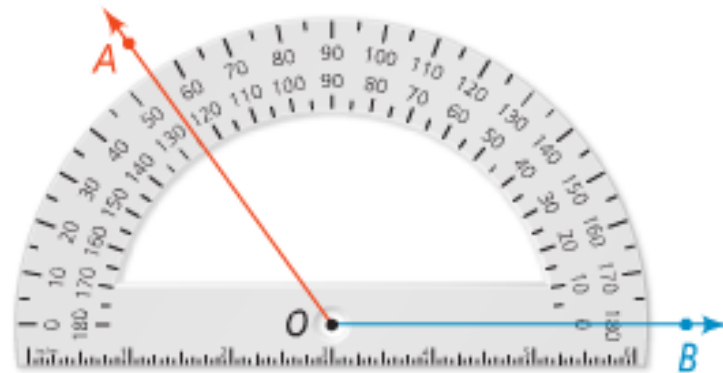
$90 < x < 180$

**straight angle**

$x°$

$x = 180$

# U1L2 - Protractor Postulate

## Postulate 1-7    Protractor Postulate

Consider $\overrightarrow{OB}$ and a point $A$ on one side of $\overrightarrow{OB}$. Every ray of the form $\overrightarrow{OA}$ can be paired one to one with a real number from 0 to 180.
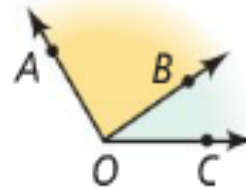
**Postulate 1-8   Angle Addition Postulate**

If point $B$ is in the interior of $\angle AOC$,
then $m\angle AOB + m\angle BOC = m\angle AOC$.

# U1L2 – Types of Angle Pairs

## Key Concept  Types of Angle Pairs

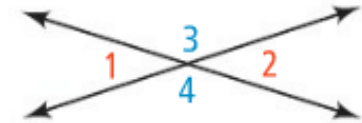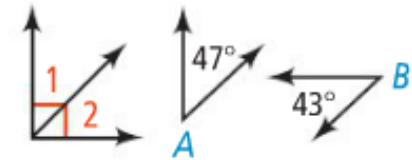| Definition | Example |
|---|---|
| **Adjacent angles** are two coplanar angles with a common side, a common vertex, and no common interior points. | $\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 4$ |
| **Vertical angles** are two angles whose sides are opposite rays. | $\angle 1$ and $\angle 2$, $\angle 3$ and $\angle 4$ |
| **Complementary angles** are two angles whose measures have a sum of 90. Each angle is called the *complement* of the other. | $\angle 1$ and $\angle 2$, $\angle A$ and $\angle B$ |
| **Supplementary angles** are two angles whose measures have a sum of 180. Each angle is called the *supplement* of the other. | $\angle 3$ and $\angle 4$, $\angle B$ and $\angle C$ |
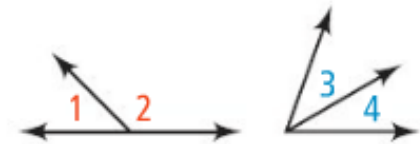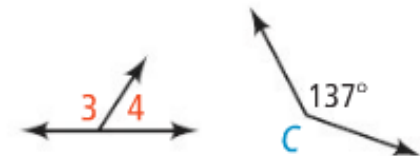
# U1L2 – Angle Bisector

- An **angle bisector** is a ray that divides an angle into two congruent angles.
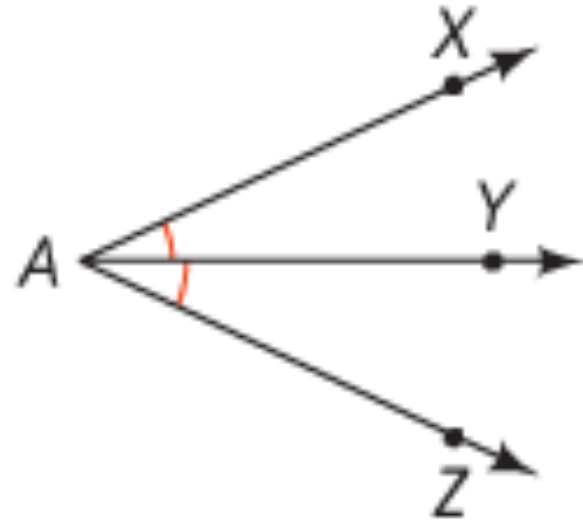
# U1L2 – Linear Pair Postulate



- A **linear pair** is a pair of adjacent angles whose noncommon sides are opposite rays.
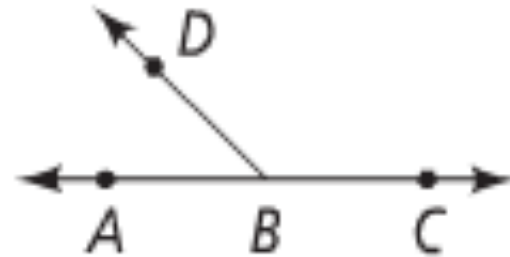


**Postulate 1-9   Linear Pair Postulate**

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

- Supplementary vs. linear pair?

# U1L2 – Reading Diagrams

- Things you can conclude from unmarked diagrams
  - Angles are adjacent
  - Angles are adjacent and supplementary
  - Angles are vertical angles

- Things you cannot conclude from unmarked diagrams
  - Angles or segments are congruent
  - An angle is a right angle
  - Angles are complementary

# U1L2 – Key Words - Constructions

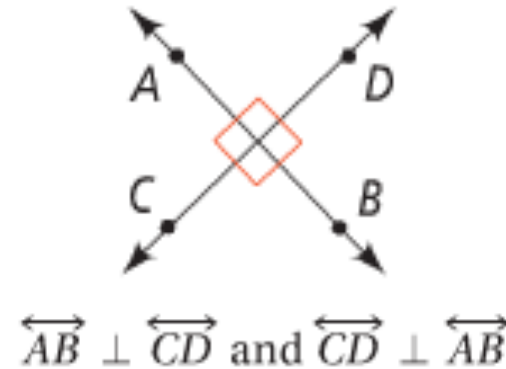A **straightedge** is a ruler with no markings on it.

A **compass** is a geometric tool used to draw circles and parts of circles called *arcs*.

A **construction** is a geometric figure drawn using a straightedge and a compass.
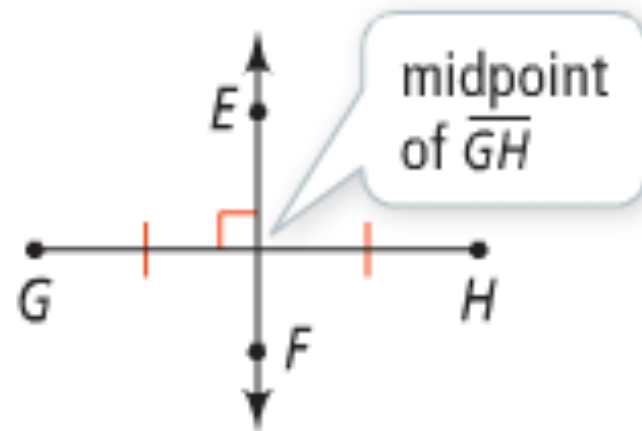
# U1L2 – Key Words – Perpendicular Lines

- **Perpendicular lines** are two lines that intersect to form right angles



$$\overleftrightarrow{AB} \perp \overleftrightarrow{CD} \text{ and } \overleftrightarrow{CD} \perp \overleftrightarrow{AB}$$

- A **perpendicular bisector** of a segment is a line, segment, or ray that is perpendicular to the segment at its midpoint.



midpoint of $\overline{GH}$

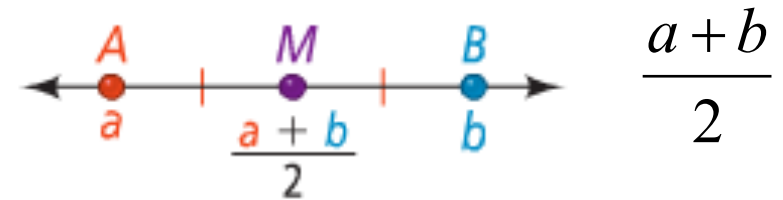# U1L2 – Key Words – Coordinate Plane

- A **coordinate** of a point is the real number that corresponds to the point.

- A **coordinate plane** is formed by a horizontal number line (the x-axis) and a vertical number line (the y-axis).
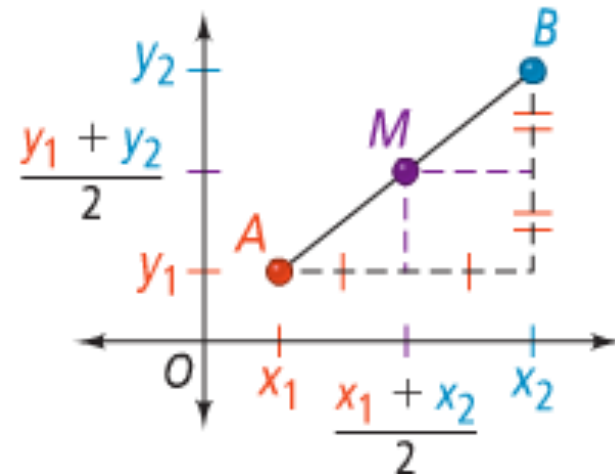
# U1L2 – Midpoint Formulas

- On a number line

$$\frac{a+b}{2}$$

- ■ In a coordinate plane

$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$
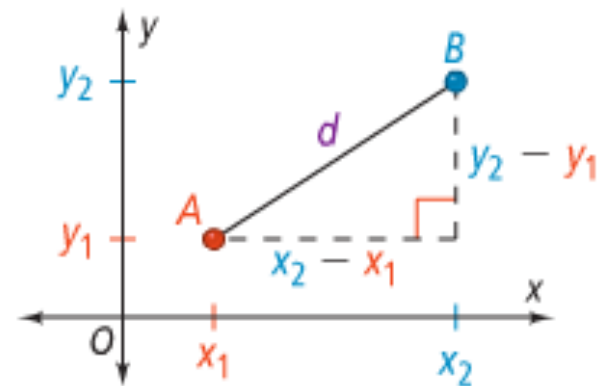
# U1L2 – Distance Formula



**take note**

## Key Concept   Distance Formula

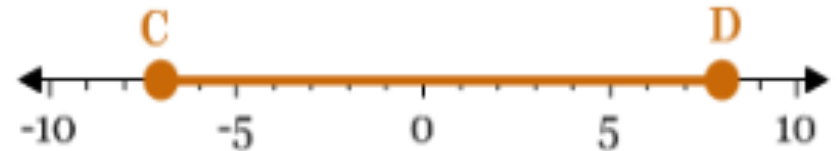The distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ is

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}.$$

# U1L2 – Partitions

- A line segment can be **partitioned** into smaller segments which are compared as ratios.

- Find a point E such that the ratio of CE to CD is $4/5$.

# U1L2 – Key Words - Polygon

- The **perimeter** (P) of a polygon is the sum of the lengths of its sides.

- The **area** (A) of a polygon is the number of square units it encloses.

# U1L2 – Key Words - Circle

- The formulas for a circle involve the special number $\pi$ (pi)

- By definition $\pi$ is equal to the circumference/diameter.

- To approximate $\pi$, we use 3.14 or 22/7.

- The circumference of a circle is the perimeter of the circle.
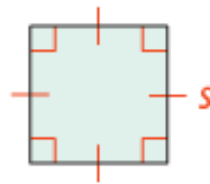
# U1L2 – Formulas



**Key Concept**   Perimeter, Circumference, and Area
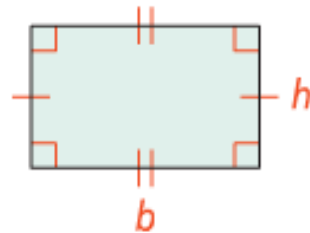
**Square**
side length $s$

$P = 4s$

$A = s^2$

**Triangle**
side lengths $a$, $b$, and $c$,
base $b$, and height $h$

$P = a + b + c$

$A = \frac{1}{2}bh$

**Rectangle**
base $b$ and height $h$

$P = 2b + 2h$, or
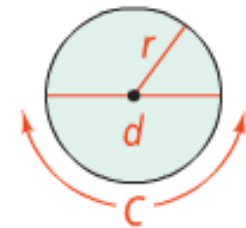$2(b + h)$

$A = bh$
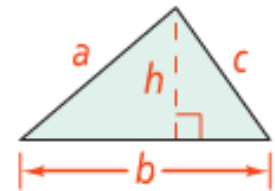
**Circle**
radius $r$ and diameter $d$

$C = \pi d$, or $C = 2\pi r$

$A = \pi r^2$

take note

# U1L2 – Area Addition Postulate

*take note*

**Postulate 1-10  Area Addition Postulate**

The area of a region is the sum of the areas of its nonoverlapping parts.

# Questions?

- Check the Message Board first

- Send a WebMail

- You can also make an appointment at https://elizondo.youcanbook.me

- You can also call me at (559) 549-3244. If I'm not available to answer your call, please leave a voicemail with your full name and phone number.