CHAPTER 1 – ESSENTIALS OF GEOMETRY

In this chapter we address three **Big IDEAS***:*

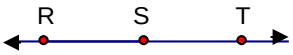
1) Describing geometric figures
2) Measuring geometric figures
3) Understanding equality and congruence

Section:	**1 – 1 Identify Points, Lines, and Planes**
Essential Question	

Warm Up:

Key Vocab:

Undefined Terms		
A basic figure that is not defined in terms of _____ _____.		
Point	An undefined term in geometry Has ____ dimension – _____ _____ _____	A _____
Line	An undefined term in geometry Has ____ dimension – _____ _____ _____	S T m _____; ___; _____
Plane	An undefined term in geometry Has ____ dimensions – _____ _____ _____	E F G $\mathcal{R}$ _____ or _____

Defined Terms		
Terms that can be described using other figures such as _____ or _____		
Collinear Points	Points that lie on the _____ _____.	
Coplanar Points	Points that lie in the _____ _____.	
Line Segment	Part of a line that consists of two points, called endpoints, and _____ _____	 _____
Ray	Half of a line that consists of _____ _____ _____	 _____; _____
Opposite Rays		 $\overrightarrow{SR}$ and $\overrightarrow{ST}$ are _____ S is the _____.
Intersection		

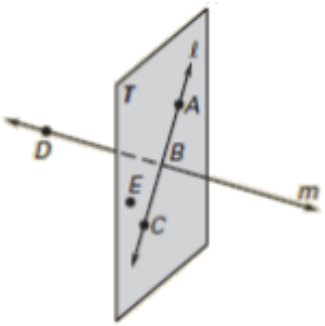
Ex 1:

a. Give two other names for $\overleftrightarrow{BD}$.

b. Give another name for plane T.

c. Name three points that are collinear.

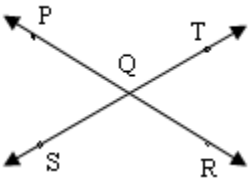
d. Name four points that are coplanar.



Ex 2:

a. Give another name for $\overline{PR}$.

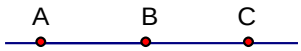
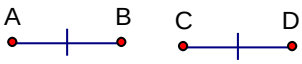
b. Name all rays with endpoint Q. Which of these rays are opposite rays?



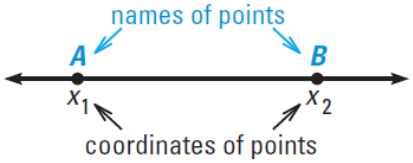
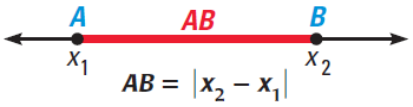
Section:	**1 – 2 Use Segments and Congruence**
Essential Question	

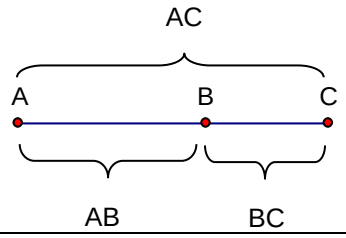
Warm Up:

Key Vocab:

Postulate or Axiom		
Theorem		
Between	When three points are _____, you can say one point is _____ the other two.	 _____
Congruent Segments	Line segments that have the _____ _____.	 _____ _____ _____ _____ _____ _____

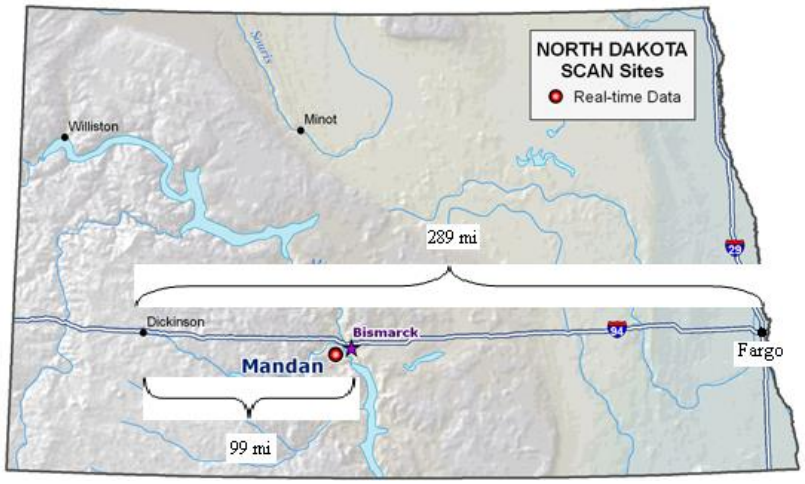
Postulates:

Ruler Postulate	
Allows for the creation of a measuring system.	
_____ _____ The real number that corresponds to a point is the _____	
The distance between points *A* and *B*, _____ is the _____ _____	

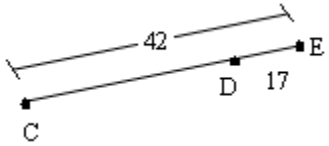
Segment Addition Postulate		
If	**then**	
If	**then**	

Show:

Ex 1: The cities shown on the map lie approximately in a straight line. Use the given distances to find the distance from Bismarck to Fargo.



Ex 2: Find *CD*.



Ex 3: Point S is between R and T on $\overline{RT}$. Use the given information to write an equation in terms of x. Solve the equation. Then find RS and ST.

$RS = 3x - 16$ $\quad$ $ST = 4x - 8$ $\quad$ $RT = 60$

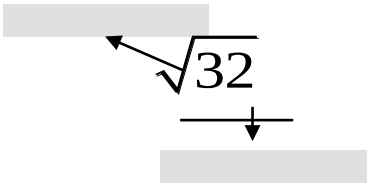
Closure:

- Explain the difference between congruence and equality.

Section:	**1 – 2 ½ Simplifying Radicals**
Essential Question	

Warm Up:

Key Vocab:

Square Root	If _____, then _____ If the square of a number r is a number s, then _____ _____ **Examples:** $2=\sqrt{4}$ *two is the square root of four* $4=\sqrt{16}$ *four is the square root of sixteen*	
Radical		
Radicand		
Simplest Radical Form	A radical expression is in simplest radical form if _____ _____ AND ____ _____ **Non-Example:** $\sqrt{18}$ 9 *is perfect square factor of* 18. *Its simplest radical form is* $3\sqrt{2}$.	
Rationalizing the Denominator	Rationalizing the denominator is a process of _____ _____ **Example:** $\frac{4}{\sqrt{3}}$ Step 1: $\frac{4}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}$ Step 2: $\frac{4\sqrt{3}}{\sqrt{9}}$ Step 3: $\frac{4\sqrt{3}}{3}$	

Key Concepts:

Simplifying Radicals:	
$\left(\sqrt[n]{b}\right)^n = \sqrt[n]{b^n} = b$	
$\sqrt{ab} = \sqrt{a} \bullet \sqrt{b}$	**The square root of a product** is **the product of the square roots** →
$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$	**The square root of a quotient** is **the quotient of the square roots** →
➢ $\sqrt{a^2 + b^2} \neq \sqrt{a^2} + \sqrt{b^2}$	**Caution!**

Simplify.

1. $\sqrt{50}$

2. $\sqrt{56}$

3. $\sqrt{12}$

4. $\sqrt{\frac{2}{5}}$

5. $\sqrt{5^2}$

6. $\sqrt{(-3)^2}$

7. $\sqrt{25 \bullet 9}$

8. $\sqrt{\frac{16}{25}}$

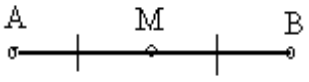
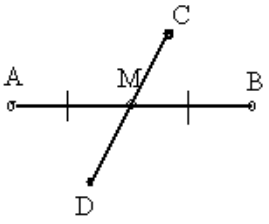
Closure:

- How do you know when a square root is fully simplified?

Section:	**1 – 3 Use Midpoint and Distance Formulas**
Essential Question	

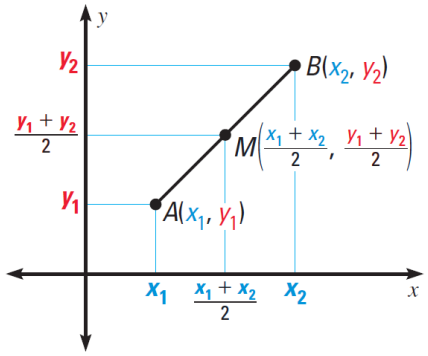
Warm Up:

Key Vocab:

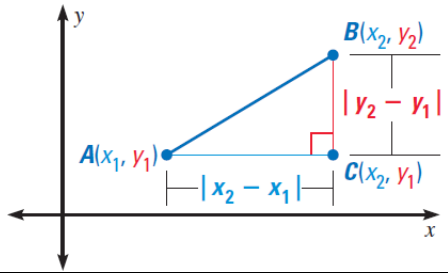
Midpoint	The point that divides the segment into _____.	 _____
Segment Bisector	_____ _____ that intersects the segment at its _____.	 _____

Key Concepts:

Midpoint Formula	
If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points on a coordinate plane,	**then** the midpoint M of $\overline{AB}$ has coordinates

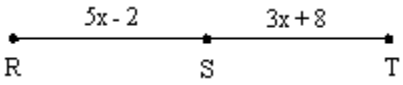


Distance Formula	
If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points in a coordinate plane,	**then** the distance between A and B is



Show:

Ex 1: Point S is the midpoint of $\overline{RT}$. Find ST.



Ex 2: Find PQ given the coordinates for its endpoints are $P(2,5)$ and $Q(-4,8)$. Give an exact answer AND approximate answer rounded to the nearest hundredth.

Ex 3:

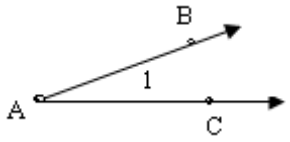
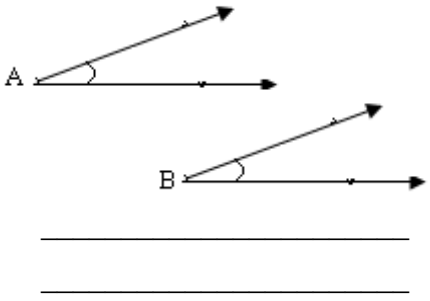
a. The endpoints of $\overline{GH}$ are G (7, -2) and H(-5, -6). Find the coordinates of the midpoint P.

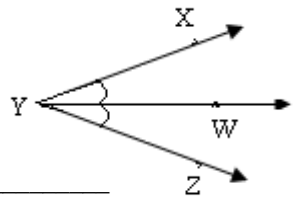
b. The midpoint of $\overline{GH}$ is M(4, -1). One endpoint is G(5, 3). Find the coordinates of the other endpoint H.

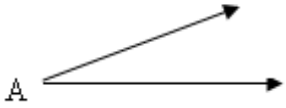
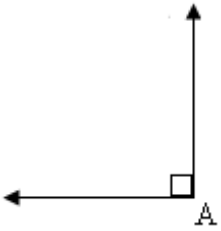
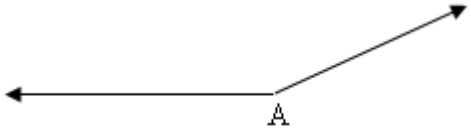
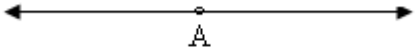
Section:	**1 – 4 Measure and Classify Angles**
Essential Question	

Warm Up:

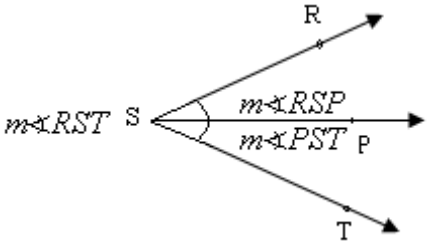
Key Vocab:

Angle	**Notation:**	
Sides	**Notation:**	
Vertex		
Congruent Angles		

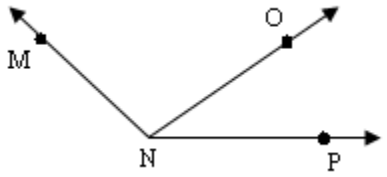
Angle Bisector	A ray that divides an angle into ____ _____	 _____ _____

Classifying Angles		
Acute Angle		
Right Angle		
Obtuse Angle		
Straight Angle		

Postulate:

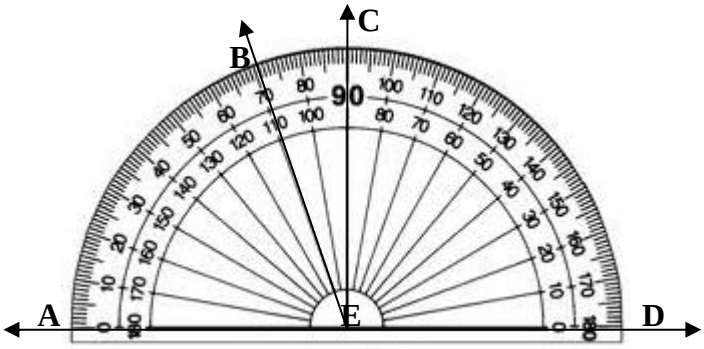
Angle Addition Postulate		
If *P* is in the interior of $\angle RST$,	**Then**	

Ex 1: Name each angle that has N as a vertex.



_____ _____ _____

Ex 2: Use the diagram to find the measure of each angle and classify the angle.



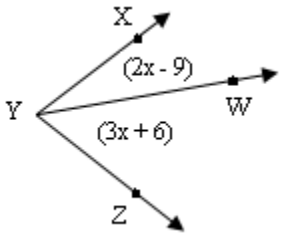
a. $\angle DEC$ _____

b. $\angle DEA$ _____

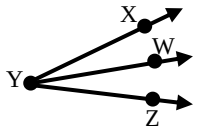
c. $\angle CEB$ _____

d. $\angle DEB$ _____

Ex 3: If $m\angle XYZ = 72°$, find $m\angle XYW$ and $m\angle ZYW$.



Ex 4: In the diagram to the right, $\overrightarrow{YW}$ bisects $\angle XYZ$ and $m\measuredangle XYW$=18°. Find $m\measuredangle XYZ$. Explain.



Closure:

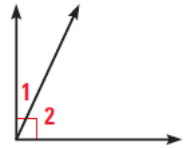
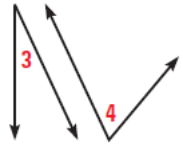
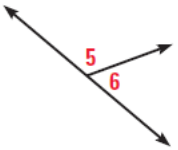
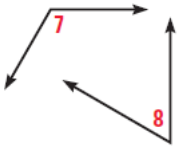
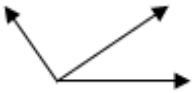
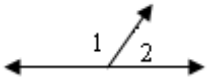
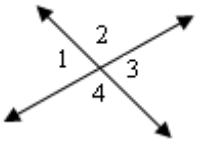
- Explain the difference between congruence and equality in terms of angles.

- What are the ways to classify angles?

Section:	**1 – 5 Describe Angle Pair Relationships**
Essential Question	

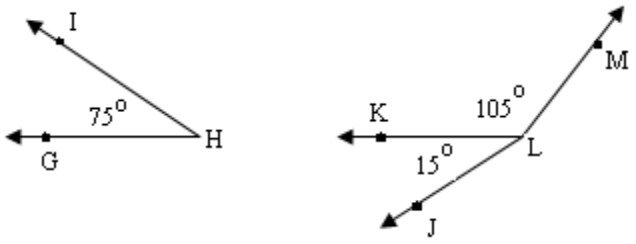
Warm Up:

Key Vocab:

Complementary Angles		 Adjacent  Non-adjacent
Supplementary Angles		 Adjacent  Non-adjacent
Adjacent Angles	Two angles that share a common _____, but have no common interior points	
Linear Pair		
Vertical Angles	Two angles whose sides form two pairs of _____ **Examples:**	

Show:

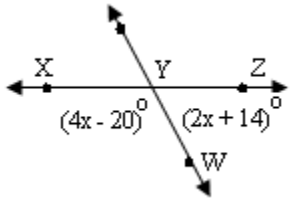
Ex 1: In the figure, name a pair of complementary angles, a pair of supplementary angles, and a pair of adjacent angles.



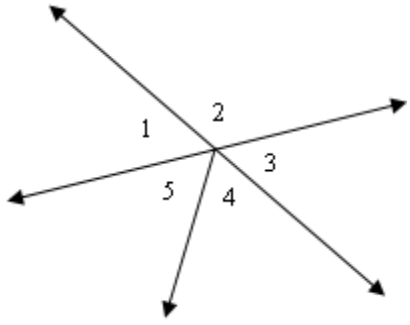
Ex 2: a. Given that $\angle 1$ is a complement of $\angle 2$ and $m\angle 1 = 17°$, find $m\angle 2$.

b. Given that $\angle 3$ is a supplement of $\angle 4$ and $m\angle 3 = 119°$, find $m\angle 4$.

Ex 3: Two roads intersect to form supplementary angles, $\angle XYW$ and $\angle WYZ$. Find $m\angle XYW$ and $m\angle WYZ$.



Ex 4: Identify all of the linear pairs and all of the vertical angles in the figure.

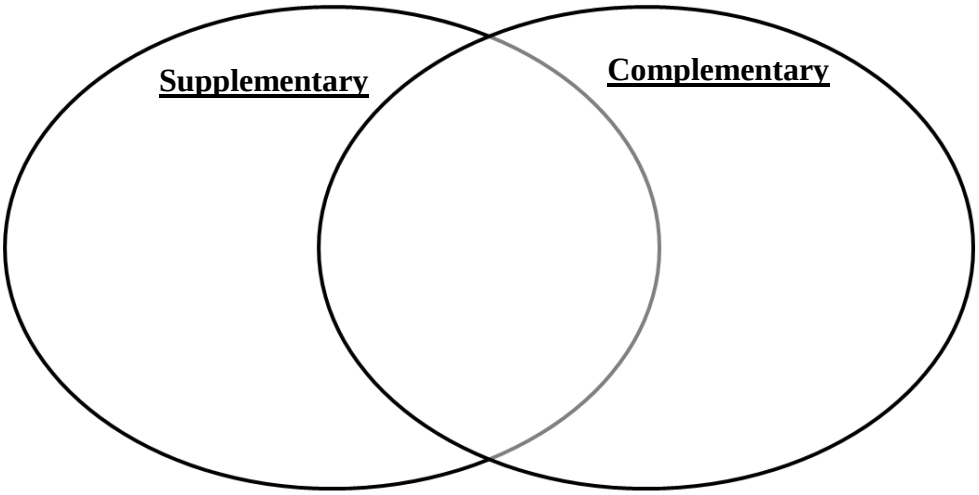


Ex 5: Two angles form a linear pair. The measure of one angle is 3 times the measure of the other angle. Find the measure of each angle.

Ex 6: The measure of one angle is 7 times the measure of its complement. Find the measure of each angle.

Closure:

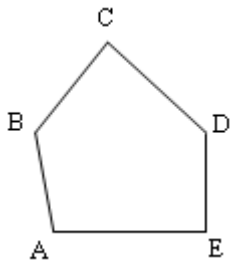
- Compare and contrast complementary and supplementary angles.

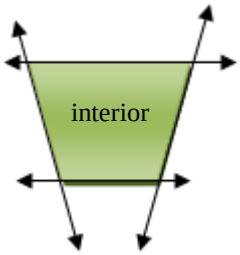


Section:	**1 – 6 Classify Polygons**
Essential Question	

Warm Up:

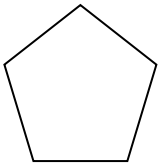
Key Vocab:

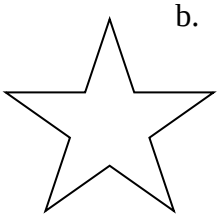
Polygon	_____ _____ each side intersects exactly _____ _____, so that no two sides with a common endpoint are collinear	 **Sides**: **Vertices**:
Sides	Each _____ segment that forms a polygon	
Vertex	Each _____ of a side of a polygon	

Convex	A polygon where no line containing a side of the polygon contains a _____ of the polygon _____ _____	
Concave	A polygon with one or more interior angles measuring _____ _____ _____	
n-gon		**Example:**
Equilateral	A polygon with all of its _____ congruent	 _____
Equiangular	A polygon with all of its _____ _____ congruent	
Regular	A _____ polygon that has ____ _____ and _____ congruent	

Show:

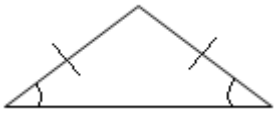
Ex 1: Tell whether each figure is a polygon. If it is, tell whether it is concave or convex.

a. 

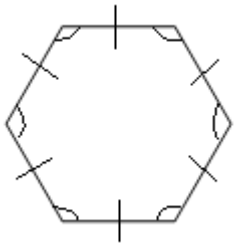
b. 

Ex 2: Classify the polygon by the number of sides. Tell whether the polygon is equilateral, equiangular, or regular. Explain your reasoning.

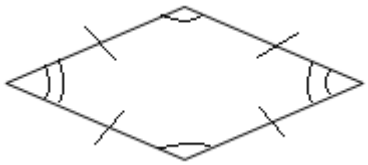
a.



b.



c.



Ex 3: A rack for billiard balls is shaped like an equilateral triangle. Find the length of a side.