2.8 Vertical Angles

After studying this section, you should be able to:

- Recognize opposite rays
- Recognize opposite angles

Definitions:

<u>Opposite Rays</u> – two collinear rays that share the same endpoint and extend in opposite directions (Together, they form a straight angle!)

Vertical Angles - the non-adjacent angles formed when two lines intersect. The rays forming the sides of one and the rays forming the sides of the other are "opposite rays."

Note: In the old days some teachers referred to these as *opposite angles* because they are the ones directly across from each other when the two lines intersect.



In this picture, $\angle 1$ and $\angle 2$ are a pair of vertical angles $\angle 3$ and $\angle 4$ are a second pair of vertical angles.

Thm: Vertical angles are congruent

That is the best part of vertical angles, they always remain congruent.

 $\angle 1 \cong \angle 2$ and $\angle 3 \cong \angle 4$

This relationship can be proven, so it is called the Vertical Angle Theorem. **Proving the Th**^m **Example:**



Given: $\measuredangle 1$ and $\measuredangle 2$ are a pair of vertical angles *Prove:* $\measuredangle 1 \cong \measuredangle 2$

Statements	Reasons
1. ≰1 and ≰2 are vertical angles	1. Given
2. Diagram as shown	2. Given
3. $41 + 43 = a$ straight angle (also known as a "linear pair")	3. Assumed from diagram
4. $42 + 43 = a$ straight angle (also known as a "linear pair")	4. Assumed from diagram
5. 41 and 43 are supplementary	5. If two angles form a straight angle, then they are supplements
6. 42 and 43 are supplementary	6. Same as 5
7. ≰1≅ ≰2	7. If two angles are supplements to SAME angle, then they are \cong

BTW: You MAY assume vertical angles from a diagram! Add that to your list of allowable assumptions immediately!

These 2 properties and the Vertical Angle Theorem are used a lot, so please do the homework on this section and get <u>well</u> acquainted with them!