### 2.8 Vertical Angles

After studying this section, you should be able to:

- Recognize opposite rays
- Recognize opposite angles


## Definitions:

Opposite Rays - 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.


## Thm: Vertical angles are congruent

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

$$
\angle 1 \cong \angle 2 \text { and } \angle 3 \cong \angle 4
$$

This relationship can be proven, so it is called the Vertical Angle Theorem.

## Proving the Th ${ }^{m}$ Example:

Given: $\Varangle 1$ and $\Varangle 2$ are a pair of vertical angles


Prove: $\Varangle 1 \cong \Varangle 2$

| Statements | Reasons |
| :--- | :--- |
| 1. $\Varangle 1$ and $\Varangle 2$ are vertical angles | 1. Given |
| 2. Diagram as shown | 2. Given |
| 3. $\Varangle 1+\Varangle 3=$ a straight angle (also known as a "linear pair") | 3. Assumed from diagram |
| 4. $\Varangle 2+\Varangle 3=$ a straight angle (also known as a "linear pair") | 4. Assumed from diagram |
| 5. $\Varangle 1$ and $\Varangle 3$ are supplementary | 5. If two angles form a straight angle, then they are supplements |
| $6 . ~$ | and $\Varangle 3$ are supplementary |
| $7 . ~$ | 6. Same as 5 $\cong$ |

$\boldsymbol{B T W}$ : 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 well acquainted with them!

