Theorem 1 - If two angles are right angles, then they are congruent.

Given: \( \angle A \) is a right \( \angle \)  
\( \angle B \) is a right \( \angle \)

Prove: \( \angle A \cong \angle B \)
**Theorem 2** - If two angles are straight angles, then they are congruent.

**Given:**
- ∠ABC is a straight ∠
- ∠DEF is a straight ∠

**Prove:**
- ∠ABC ≅ ∠DEF

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<tr>
<th>Statements</th>
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<tbody>
<tr>
<td>A B C D E F</td>
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**Theorem 4** - If angles are supplementary to the same angle, then they are congruent.

**Given:**
- \( \angle A \) is supp. to \( \angle X \)
- \( \angle B \) is supp. to \( \angle X \)

**Prove:** \( \angle A \cong \angle B \)

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<tr>
<td>( \angle A ) is supp. to ( \angle X )</td>
<td>( \angle A ) is supp. to ( \angle X )</td>
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<td>( \angle B ) is supp. to ( \angle X )</td>
<td>( \angle B ) is supp. to ( \angle X )</td>
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<td>( \angle A \cong \angle B )</td>
<td>( \angle A \cong \angle B )</td>
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Theorem 5 - If \( \angle s \) are supplementary to \( \angle s \), then they are equal.

Given: \( \angle AYZ = \angle BYX \)

Prove: \( \angle 1 = \angle 2 \)
Theorem 6 - If angles are complementary to the same angle, then they are congruent.

Given:  \( \angle A \) is compl. to \( \angle X \)  
\( \angle B \) is compl. to \( \angle X \)

Prove:  \( \angle A = \angle B \)
**Theorem 7** - If \( \angle \)s are complementary to \( \angle \)s, then they are \( \cong \).

**Given:**
- \( YS \perp XZ \)
- \( \angle 3 = \angle 4 \)

**Prove:** \( \angle 1 = \angle 2 \)

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<tr>
<td>( YS \perp XZ )</td>
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<tr>
<td>( \angle 3 = \angle 4 )</td>
<td>Given</td>
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<td>( \angle 1 = \angle 2 )</td>
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Theorem 8 - If a segment is added to two congruent segments, then the sums are congruent.

(The Addition Property of Congruent Segments - Version 1).

Given: \( AB = CD \)

Prove: \( AC = BD \)

Statements | Reasons
Theorem 9 - If an angle is added to two \( \cong \) angles, then the sums are \( \cong \) (The Addition Property of \( \cong \) s - Version 1).

Given: \( \angle EFJ = \angle GFH \)

Prove: \( \angle EFH = \angle GFJ \)

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\[ \begin{array}{c}
\text{F} \\
\text{E} \\
\text{J} \\
\text{H} \\
\text{G}
\end{array} \]
Theorem 10 - If \( \overline{AB} \cong \overline{DC} \), \( \overline{AX} \cong \overline{YC} \), \( \overline{XB} \cong \overline{DY} \), the resulting segments are \( \overline{AB} \cong \overline{DC} \).

**Given:**

- \( \overline{AX} \cong \overline{YC} \)
- \( \overline{XB} \cong \overline{DY} \)

**Prove:**

- \( \overline{AB} \cong \overline{DC} \)

**Statements**

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<tr>
<td>( \overline{XB} \cong \overline{DY} )</td>
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**Reasons**
Theorem 11 - If \( \cong \) angles are added to \( \cong \) angles, the resulting angles are \( \cong \) (The Addition Property of \( \cong \)s - Version 2).

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| **Given:** |∠HGI \( \cong \) ∠HJI  
∠IGJ \( \cong \) ∠IJG |
| **Prove:** |∠HGJ \( \cong \) ∠HJG |

[Diagram showing triangles HGI, IGI, and HJI with points H, G, I, J, and connections between them.]
**Theorem 12** - If an angle is subtracted from two \(\cong\) angles, then the resulting \(\cong\)s are \(\cong\) (The Subtraction Property of \(\cong\)s - Version 1).

**Given:** \(\angle EFH = \angle GFJ\)

**Prove:** \(\angle EFJ = \angle GFH\)

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[Diagram of angles E, F, G, J, H, showing the relationship between \(\angle EFH\) and \(\angle GFJ\).]
Theorem 13 - If \( \angle s \) are subtracted from \( \angle s \) the resulting \( \angle s \) are =
(The Subtraction Property of \( \angle s \) - Version 2)

Given: \( \angle 1 = \angle 2 \)
\( \angle ABC = \angle XYZ \)

Prove: \( \angle 3 = \angle 4 \)
Theorem 14 - If angles are $\cong$, their like multiples are $\cong$ (Multiplication Property of $\cong$'s).

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<tr>
<td>$\angle 1 = \angle 2$</td>
<td>Theorem 14</td>
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<tr>
<td>$\overline{BD}$ bisects $\angle ABC$</td>
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</tr>
<tr>
<td>$\overline{YW}$ bisects $\angle XYZ$</td>
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<tr>
<td>$\angle ABC = \angle XYZ$</td>
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Theorem 15 - If segments are $\cong$, their like divisions are $\cong$ (Division Property of $\cong$ Segments).

**Given:**
\[
\overline{AB} = \overline{XY}
\]
M & N are midpoints

**Prove:**
\[
\overline{AM} = \overline{XN}
\]

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\[\overline{AB} = \overline{XY}\]

\[\text{M & N are midpoints}\]

\[\overline{AM} = \overline{XN}\]
Theorem 16 - If segments (or \(\angle\)s) are = to the same segment (or \(\angle\)), they are = to each other (Transitive Property of = Segments or \(\angle\)s - Version 1).

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<tr>
<td>Given: (\angle A = \angle B) (\angle A = \angle C)</td>
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<tr>
<td>Prove: (\angle B = \angle C)</td>
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Diagram: Triangle ABC with \(\angle A\) at point A, \(\angle B\) at point B, and \(\angle C\) at point C.
Theorem 17 - If segments (or $\angle$s) are $\cong$ to segments (or $\angle$s), they are $\cong$ to each other (Transitive Property of $\cong$ Segments or $\angle$s - Version 2).

Given: $\angle A \cong \angle X$
$\angle B \cong \angle Y$
$\angle X \cong \angle Y$

Prove: $\angle A \cong \angle B$
Theorem 18 - Vertical Angles are $\cong$

Given: Diagram as shown.
Prove: $\angle 1 \cong \angle 3$