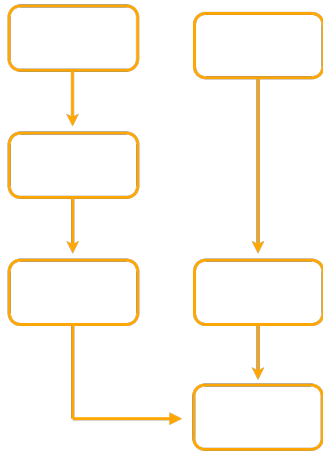# Different Types of Proofs

Three types of proofs

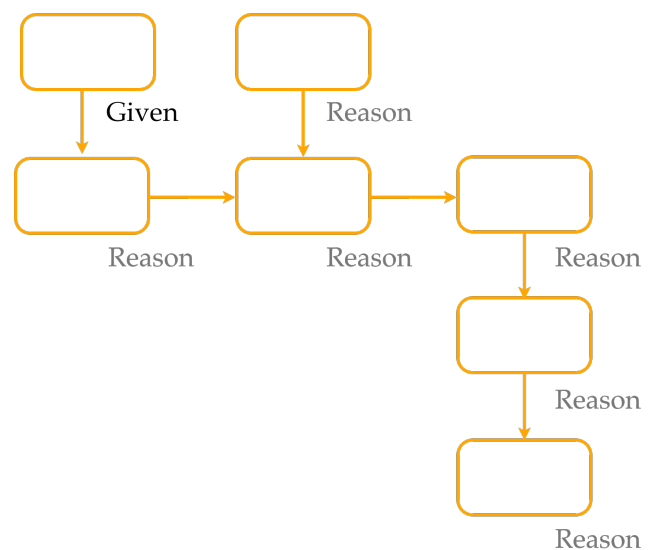### Flowchart proof

Paragraph proof

Since $\angle 2 \cong \angle 3$, we know that $m\angle 2 = m\angle 3$ by the definition of congruent angles. Since $\angle 1$ and $\angle 2$ are vertical angles, they are congruent. Since they are congruent, we know that $m\angle 1 = m\angle 2$ by the definition of congruent angles. By the Transitive property of equality, we know then that $m\angle 1 = m\angle 3$. Thus, $\angle 1 \cong \angle 3$ by the definition of congruent angles.

Two-column proof

Statements	Reasons
1. Hypothesis	1. Given
2. Statement	2. Reason
3. Statement	3. Reason
4. Statement	4. Reason
5. Statement	5. Reason
6. Conclusion	6. Reason

Flowchart proof

statements written in each box

justification written below the box

arrows lead us to the next statement

left to right or top to bottom

Given

Reason

Reason   Reason   Reason

Reason

Reason

Flowchart proof

∠1 and ∠2 are vertical ∠s

Def. of Vertical Angles

∠2 ≅ ∠3

Given

∠1 ≅ ∠2

Vertical Angle Theorem

$m∠1 = m∠2$

Definition of congruent angles

$m∠2 = m∠3$

Definition of congruent angles

$m∠1 = m∠3$

Transitive property of equality

∠1 ≅ ∠3

Definition of congruent angles

Given: ∠2 ≅ ∠3
Prove: ∠1 ≅ ∠3
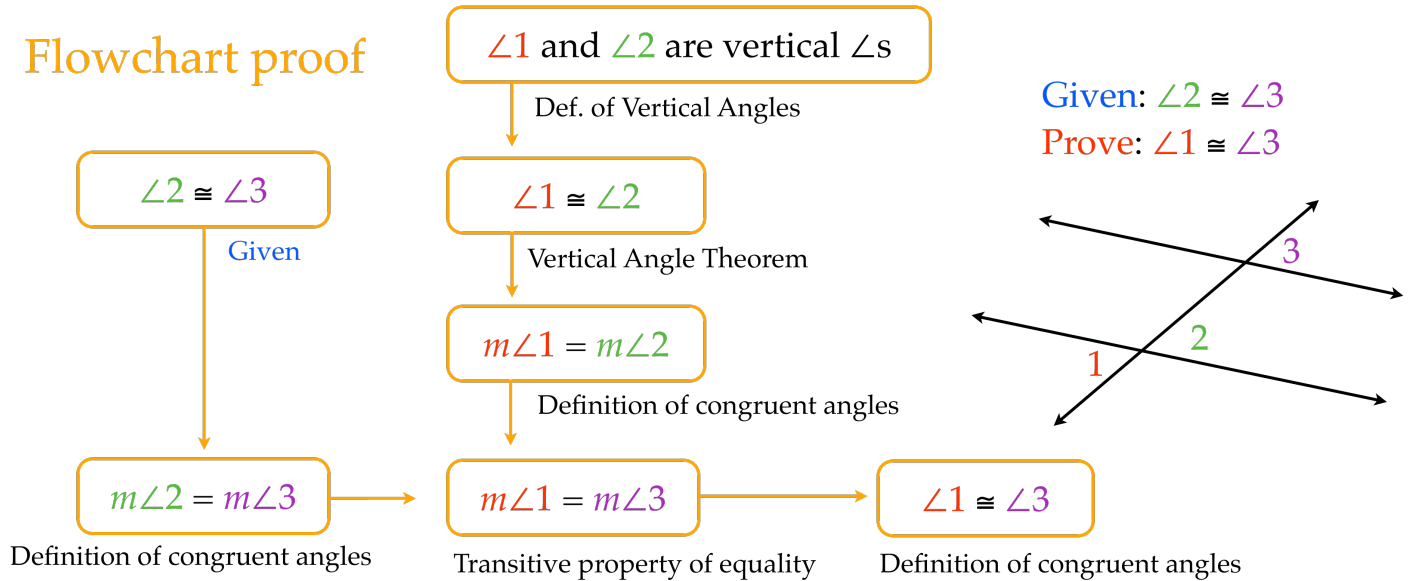
Paragraph proofs

begins with the given statement

use complete sentences throughout proof

insert conjunctions and transition words for clarity

combine justifications with each statements

Paragraph proofs

Since ∠2 ≅ ∠3, we know that $m\angle 2 = m\angle 3$ by the definition of congruent angles. ∠1 and ∠2 are vertical by definition of vertical angles. Since ∠1 and ∠2 are vertical angles, ∠1 ≅ ∠2 by the Vertical Angle Theorem. Since they are congruent, we know that $m\angle 1 = m\angle 2$ by the definition of congruent angles. By the Transitive property of equality, we know then that $m\angle 1 = m\angle 3$. Thus, ∠1 ≅ ∠3 by the definition of congruent angles.
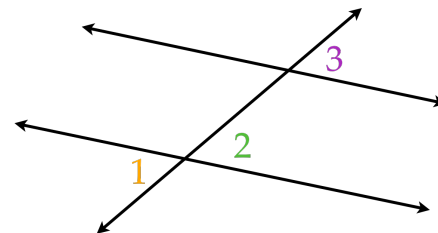
Two-column proofs
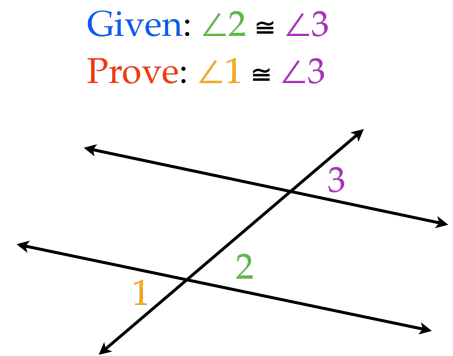
start with the given

work from top to bottom

list the statements in the left column

list the corresponding reasons
in the right column

Statements	Reasons
1. Statement	1. Given
2. Statement	2. Reason
3. Statement	3. Reason
4. Statement	4. Reason
5. Conclusion	5. Reason

Two-column proofs

Statements	Reasons
1. $\angle 2 \cong \angle 3$	1. Given
2. $m\angle 2 = m\angle 3$	2. Definition of congruent angles
3. $\angle 1$ and $\angle 2$ are vert. $\angle$s	3. Definition of Vertical Angles
4. $\angle 1 \cong \angle 2$	4. Vertical Angle Theorem
5. $m\angle 1 = m\angle 2$	5. Definition of congruent angles
6. $m\angle 1 = m\angle 3$	6. Transitive property of equality (#2 and #5)
7. $\angle 1 \cong \angle 3$	7. Definition of congruent angles

Given: $\angle 2 \cong \angle 3$

Prove: $\angle 1 \cong \angle 3$

Three types of proofs

Flowchart proof

Paragraph proof

Since $\angle 2 \cong \angle 3$, we know that $m\angle 2 = m\angle 3$ by the definition of congruent angles. Since $\angle 1$ and $\angle 2$ are vertical angles, they are congruent. Since they are congruent, we know that $m\angle 1 = m\angle 2$ by the definition of congruent angles. By the Transitive property of equality, we know then that $m\angle 1 = m\angle 3$. Thus, $\angle 1 \cong \angle 3$ by the definition of congruent angles.

Two-column proof

Statements	Reasons
1. Hypothesis	1. Given
2. Statement	2. Reason
3. Statement	3. Reason
4. Statement	4. Reason
5. Statement	5. Reason
6. Conclusion	6. Reason