

Geometry: A Complete Course (with Trigonometry)

Module C - Course Notes

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VideoText Interactive

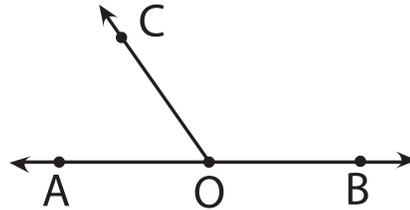
THEOREM 10

1) "If the exterior sides of two adjacent angles are opposite rays, then the two angles are supplementary."

3) Given: $\angle AOC$ and $\angle COB$ are adjacent angles with exterior sides that are opposite rays.

4) Prove: $\angle AOC$ and $\angle COB$ are supplementary

2)



5) Analysis: Definition of a Straight Angle, Postulate 7 (Protractor)

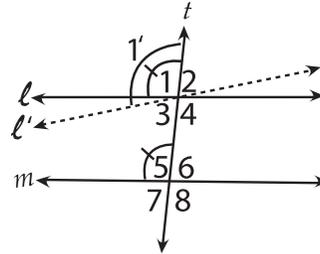
6) STATEMENT	REASON
1. $\angle AOC$ and $\angle COB$ are adjacent angles with exterior sides that are opposite rays	1. Given
2. \vec{OC} lies between \vec{OA} and \vec{OB}	2. Definition of Adjacent Angles
3. $m\angle AOC + m\angle COB = m\angle AOB$	3. Postulate 7 (Protractor) - Angle-Addition Assumption
4. $\angle AOB$ is a straight angle	4. Definition of a Straight Angle
5. $m\angle AOB = 180$	5. Definition of a Straight Angle
6. $m\angle AOC + m\angle COB = 180$	6. Substitution
7. $\angle AOC$ and $\angle COB$ are supplementary	7. Definition of Supplementary Angles (Q.E.D.)

THEOREM 19

1) “If two lines are cut by a transversal so that corresponding angles are congruent, then the two lines are parallel.”

3) Given: ℓ and m are cut by a transversal t .
 $\angle 1 \cong \angle 5$

2)



4) Prove: $\ell \parallel m$

5) Analysis: Indirect Proof

6) STATEMENT	REASON
1. ℓ and m are cut by a transversal t with $\angle 1 \cong \angle 5$	1. Given
2. $m\angle 1 = m\angle 5$	2. Definition of Congruent Angles
3. Suppose $\ell \not\parallel m$	3. Indirect Proof Assumption
4. Draw an auxiliary line ℓ' through the intersection of t and ℓ , such that $\ell' \parallel m$	4. Postulate 9 (Uniqueness of Parallel Lines) - “In a plane, through a point not on a given line, there is exactly one line, parallel to the given line.”
5. $\angle 1' \cong \angle 5$	5. Postulate 11 - “If two parallel lines are cut by a transversal, then corresponding angles are congruent”
6. $m\angle 1' = m\angle 5$	6. Definition of Congruent Angles
7. $m\angle 1 = m\angle 1'$	7. Substitution
8. $m\angle 1 \neq m\angle 1'$	8. Postulate 7 (Protractor) - “In a half-plane, the set of all rays with a common endpoint in the edge of the half-plane, can be put into a one-to-one correspondence with the real numbers from 0 to 180, inclusive.”
9. $\ell \parallel m$	9. Reduction Ad Absurdum (R.A.A.)