Midterm Study Guide

Mid-Second Semester Examination

Academic Year 2024-2025

Subject: Math

Grade 9

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Content: enVision Integrated Mathematics II

Topics Covered

Chapter	Lesson	Pages
Relationships in Triangles	1- Writing Proofs	297-303
	2- Parallel Lines	304-310
	6- Inequalities in One Triangle	336-342

Please study the material listed in the table above with a focus on the points below.

Please use your textbook, notes, and worksheets to study.

Key Topics and Concepts

Lesson 1: Writing Proofs

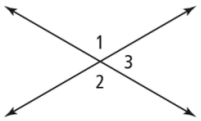
- Math Literacy and Vocabulary
- Identify all theorems [From Handout]
- Write a two-column proof
- Apply the vertical angles theorem
- Write a paragraph proof
- Write a proof using a theorem

Proofs

Proofs use given information and logical steps justified by **definitions, postulates, theorems,** and **properties** to reach a conclusion.

Given: $\angle 1$ and $\angle 2$ and are vertical angles

Prove: $\angle 1 \cong \angle 2$



PROOF Two-Column Proof

Statements	Reasons
1) $\angle 1$ and $\angle 2$ are a vertical angles	1) Given
2) $m\angle 1 + m\angle 3 = 180°$ and $m\angle 2 + m\angle 3 = 180°$	2) Supplementary Angles
3) $m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$	3) Subst. Prop. of Equality
4) $m\angle 1 = m\angle 2$	4) Subtr. Prop. of Equality
5) $\angle 1 \cong \angle 2$	5) Def. $\cong$ angles

PROOF Paragraph Proof

By Supplementary Angles, $m\angle 1 + m\angle 3 = 180°$ and $m\angle 2 + m\angle 3 = 180°$. By the Substitution Property of Equality, $m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$. Subtracting $m\angle 3$ from each side of the equation gives $m\angle 1 = m\angle 2$. Then by the definition of congruent angles, $\angle 1 \cong \angle 2$.

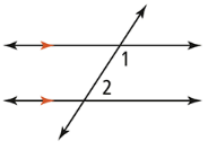
Lesson 2: Parallel Lines

- Math Literacy and Vocabulary
- Identify angle pairs
- Explore angle relationships
- Prove alternate interior angles theorem
- Use parallel lines to prove an angle relationship
- Find angle measure

There are four special angle relationships formed when parallel lines are intersected by a transversal.

POSTULATE 7-1 Same-Side Interior Angles Postulate

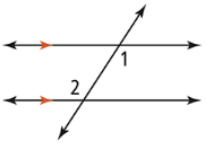
If...



Then... $m\angle 1 + m\angle 2 = 180$

THEOREM 7-7 Alternate Interior Angles Theorem

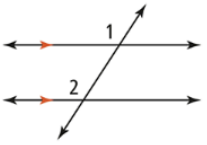
If...



Then... $\angle 1 \cong \angle 2$

THEOREM 7-8 Corresponding Angles Theorem

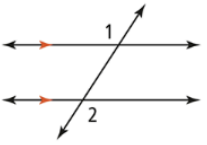
If...



Then... $\angle 1 \cong \angle 2$

THEOREM 7-9 Alternate Exterior Angles Theorem

If...



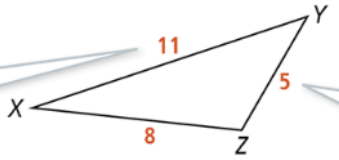
Then... $\angle 1 \cong \angle 2$

Lesson 6: Inequalities in One Triangle

- Math Literacy and Vocabulary
- Investigate side and angle relationships
- Use theorem 7-18
- Prove and use theorem 7-19
- Use the triangle inequality theorem

THEOREMS 7-18 AND 7-19

The longest side is opposite the largest angle.



The shortest side is opposite the smallest angle.

$ZY < XZ < XY$

$m\angle X < m\angle Y < m\angle Z$

THEOREM 7-20 Triangle Inequality Theorem

The sum of the lengths of any two sides is greater than the length of the third side.

$5 + 8 > 11$
$5 + 11 > 8$
$8 + 11 > 5$