

Name: _____
Geometry

Date: _____
Band: _____

Unit 2: Reasoning and Proof Study Guide

LT#1: Use inductive reasoning to make conjectures.

Describe the pattern. What are the next two terms in the sequence?

1. $1, -3, 9, -27, \dots$
2. $1000, 100, 10, \dots$
3. $5, -5, 5, -5, \dots$
4. $34, 27, 20, 13, \dots$
5. $6, 24, 96, 384, \dots$

Find a counterexample to show that each conjecture is false.

6. The product of any integer and 2 is greater than 2.
7. The city of Portland is Oregon.

LT#2: Recognize conditional statements and their parts.

8. What is the converse of the conditional statement below? What is its truth value?
If you are a teenager, then you are younger than 20.

Rewrite each sentence as a conditional statement.

9. All motorcyclists wear helmets.
10. Two nonparallel lines intersect in one point.
11. Angles that form a linear pair are supplementary.
12. School is closed on certain holidays.

LT#3: Write converses, inverses, and contrapositives of conditionals.

Write the converse, inverse, and contrapositive of the given conditional. Then determine the truth value of each statement.

13. If an angle is obtuse, then its measure is greater than 90 and less than 180.
14. If a figure is a square, then it has four sides.
15. If you play the tuba, then you play an instrument.
16. If you baby-sit, then you are busy on Saturday night.

LT#4: Write biconditionals and recognize good definitions.

17. Is the following definition reversible? If yes, write it as a true biconditional.
A hexagon is a polygon with exactly six sides.

Determine whether each statement is a good definition. If not, explain.

18. A newspaper has articles you read.
19. A linear pair is a pair of adjacent angles whose noncommon sides are opposite rays.
20. An angle is a geometric figure.

21. Write the following definition as a biconditional.

An oxymoron is a phrase that contains contradictory terms.

22. Write the following biconditional as two statements, a conditional and its converse.

Two angles are complementary if and only if the sum of their measures is 90.

LT#5: Use the Law of Detachment and the Law of Syllogism.

23. What can you conclude from the given information?

Given: If you play hockey, then you are on the team.

If you are on the team, then you are a varsity athlete.

Use the Law of Detachment to make a conclusion.

24. If you practice tennis every day, then you will become a better player. Laurel practices tennis every day.

25. $\angle 1$ and $\angle 2$ are supplementary. If two angles are supplementary, then the sum of their measures is 180.

Use the Law of Syllogism to make a conclusion.

26. If two angles are vertical, then they are congruent. If two angles are congruent, then their measures are equal.

27. If your father buys new gardening gloves, then he will work in his garden. If he works in his garden, then he will plant tomatoes.

LT#6: Connect reasoning in algebra and geometry.

28. What is the name of the property that justifies going from the first line to the second line?

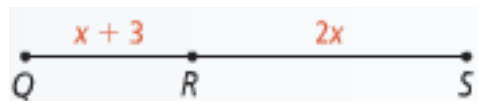
$$\angle A \cong \angle B \text{ and } \angle B \cong \angle C$$

$$\angle A \cong \angle C$$

29. Fill in the reason that justifies each step.

Given: $QS = 42$

Prove: $x = 13$



Statements	Reasons
1. $QS = 42$	1. _____
2. $QR + RS = QS$	2. _____
3. $(x + 3) + 2x = 42$	3. _____
4. $3x + 3 = 42$	4. _____
5. $3x = 39$	5. _____
6. $x = 13$	6. _____

Use the given property to complete the statement.

30. Division Property of Equality

If $2(AX) = 2(BY)$, then $AX = \underline{\hspace{2cm}}$

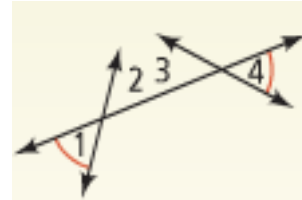
31. Distributive Property: $3p - 6q = 3(\underline{\hspace{2cm}})$

LT#7: Prove and apply theorems about angles.

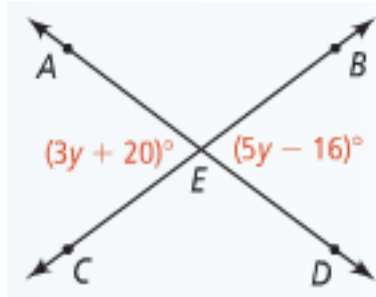
7. Write a paragraph proof.

Given: $\angle 1 \cong \angle 4$

Prove: $\angle 2 \cong \angle 3$



Use the diagram for #34-37.



33. Find the value of y .

34. Find $m\angle AEC$.

35. Find $m\angle BED$.

36. Find $m\angle AEB$.

37. **Given:** $\angle 1$ and $\angle 2$ are complementary. $\angle 3$ and $\angle 4$ are complementary. $\angle 2 \cong \angle 4$.

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

