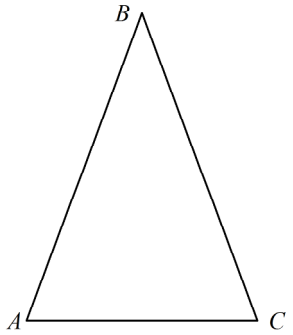
Name: _____ Class: _____ Date: _____ ID: A

Geo Unit 2 Study Guide--Logical Reasoning

Determine whether the conjecture is true *or* false*.*
Give a counterexample for any false conjecture.

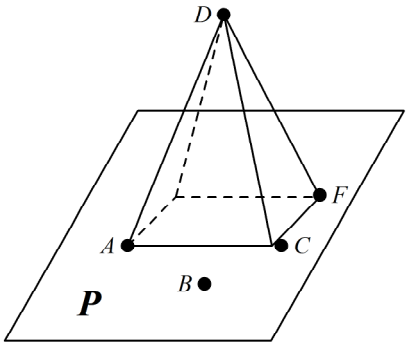
1. Given:



Conjecture: $\angle BCA \cong \angle BAC$

A) False; the angles are not vertical.
B) True
C) False; the angles are not complementary.
D) False; there is no indication of the measures of the angles.

In the figure below, points A, B, C, *and* F *lie on plane* ***P****. State the postulate that can be used to show each statement is true.*



2. *A* and *B* are collinear.

A) If two points lie in a plane, then the entire line containing those points lies in that plane.
B) Through any two points there is exactly one line.
C) If two lines intersect, then their intersection is exactly one point.
D) A line contains at least two points.

3. Identify the inverse of the statement *If a triangle has 3 equal sides, then it is equilateral*.

4. Which best describes the statement *A plane contains at least 3 points not on the same line*?

A) always true

B) sometimes true

C) never true

D) cannot tell

Choose the property that justifies the statement.

5. If $3x = 6$, then $x = 2$.

6. Identify the contrapositive of the following statement. If $x = 2$, then $x + 3 = 5$.

A) If $x + 3 = 5$, then $x = 2$.

B) If $x + 3 \neq 5$, then $x \neq 2$.

C) If $x \neq 2$, then $x + 3 \neq 5$.

D) $x = 2$ and $x + 3 = 5$.

7. What law can be used to determine that the conclusion is valid based on the given statements?

Given: If an angle is acute, then it cannot be obtuse. $\angle A$ is acute.
Conclusion: $\angle A$ cannot be obtuse.

A) Law of Detachment

B) Law of Syllogism

C) Law of Converse

D) The conclusion is not valid.

8. Which law can be used to determine that the conclusion is valid based on the given statements?

Given: If a figure has 4 right angles, then the figure is a rectangle. A rectangle has 2 pairs of parallel sides.
Conclusion: If a figure has 4 right angles, then the figure has 2 pair of parallel sides.

A) Law of Detachment

B) Law of Syllogism

C) Law of Converse

D) The conclusion is invalid.

9. What law can be used to determine that the conclusion is valid based on the given statements?

Given: All dogs like biscuits. Sammy is a dog.
Conclusion: Sammy likes biscuits.

A) Law of Detachment

B) Law of Syllogism

C) Law of Converse

D) The conclusion is not valid.

10. Which law can be used to determine that the conclusion is valid based on the given statements?

Given: All sparrows fly. All robins fly.
Conclusion: All sparrows are robins.

A) Law of Detachment

B) Law of Syllogism

C) Law of Converse

D) The conclusion is invalid.

11. Which of the following is an essential part of a good proof?

A) an if–then statement

B) using the contrapositive

C) listing the given information

D) defining all the terms

Simplify.

12. $\sqrt{128}$

Determine whether statement (3) follows from statements (1) and (2) by the Law of Detachment or the Law of Syllogism. If it does, state which law was used. If it does not, write invalid.

13. (1) If you study math you will be smart.
(2) If you are smart you will win the spelling bee.
(3) If you study math you will win the spelling bee.
A) yes; Law of Detachment
B) invalid
C) yes; Law of Syllogism

14. Identify the inverse of the following statement.

If $x = 5$, then $x + 8 = 13$.

A) If $x + 8 = 13$, then $x = 5$.

B) $x = 5$ and $x + 8 = 13$.

C) If $x + 8 \neq 13$, then $x \neq 5$.

D) If $x \neq 5$, then $x + 8 \neq 13$.

15. Identify the contrapositive of the following statement. If $x = 5$, then $x + 8 = 13$.

A) If $x + 8 =13$, then $x = 5$.

B) $x = 5$ and $x + 8 = 13$.

C) If $x + 8 \neq 13$, then $x \neq 5$.

D) If $x \neq 5$, then $x + 8 \neq 13$.

16. Choose the property that justifies the following statement. If $x = y$ and $y = z$, then $x = z$.

A) Conditional

B) Transitive

C) Symmetric

D) Reflexive

17. Choose the property that justifies the following statement. *If* $3AB = CD$, *then* $AB = \frac{1}{3}CD$.

A) Addition

B) Subtraction

C) Division

D) Substitution

18. Choose the property that justifies the following statement. *If* $\overline{GH} \cong \overline{FD}$ *and* $\overline{FD} \cong \overline{CB}$, *then* $\overline{GH} \cong \overline{CB}$.

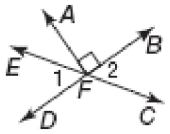
A) Reflexive

B) Symmetric

C) Transitive

D) Def. ofsegments

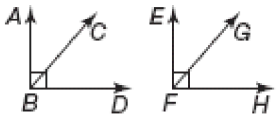
Use the figure below to answer the following questions.



19. Find $m\angle AFE$ if $m\angle BFC = 55$.

20. If $m\angle 1 = 3x + 15$ and $m\angle 2 = 6x + 3$, find x.

Use the figures below to answer the following questions.



21. If $m\angle ABC = 34$, find $m\angle CBD$.

22. If $\angle ABC \cong \angle EFG$ and $m\angle ABC = 41$, find $m\angle GFH$.

Write the contrapositive of the conditional statement. Determine whether the contrapositive is true *or* false. *If it is false, find a counterexample.*

23. A line is determined by two points.

Write the inverse of the conditional statement. Determine whether the inverse is true *or* false. *If it is false, find a counterexample.*

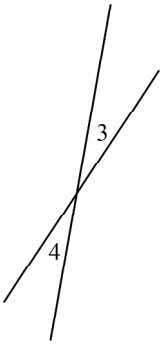
24. The segment bisector is the midpoint.

Make a conjecture about the next item in the sequence.

25. 1, 0.5, 0.25, 0.125, 0.0625

26. 6, 2, – 4, – 8, 16

27. The runways at an airport intersect as shown. The measure of $\angle 3$ at the intersection is 48°. Find the measure of $\angle 4$.

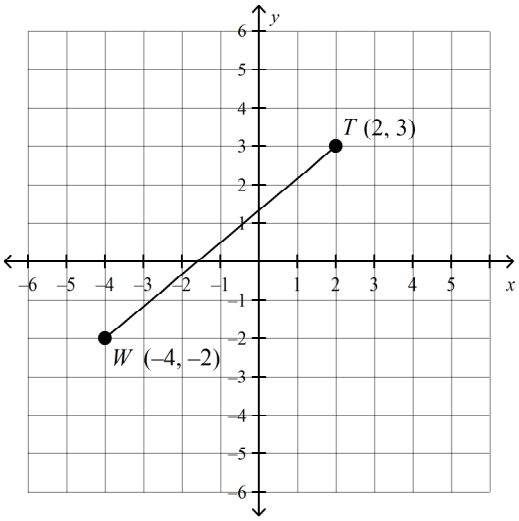


Write the statement in if-then form.

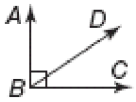
28. Two angles measuring 90 are complementary.

Use the Distance Formula to find the distance between each pair of points. Answer in implified radical form.

29.



30. If $m\angle ABD = 56$, find $m\angle DBC$.

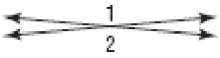


31. Write the statement *All chickens have two wings* in if–then form.

32. Write the inverse of the statement *If two lines are parallel to a third line, then they are parallel to each other*.

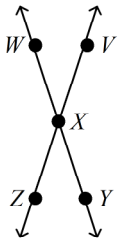
33. Name the operation that transforms $4x - 2 = 7x + 7$ to $4x = 7x + 9$, then find the value of x.

34. If $m\angle 1 = 5x + 20$ and $m\angle 2 = 3x + 80$, find $m\angle 1$.



Write a two-column proof.

35. $\overleftrightarrow{WY}$ and $\overleftrightarrow{VZ}$ intersect at point X, $m\angle WXV = 4s - 9$, and $m\angle ZXY = 2s + 17$. Prove $s = 13$.



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36. If $ZY = 7XY$, then $ZX = 8XY$.