Unit 1

Indicate the answer choice that best completes the statement or answers the question.

Use the Law of Syllogism to draw a valid conclusion from each set of statements, if possible. If no valid conclusion can be drawn, write no valid conclusion.

1. If a hurricane is Category 5, then winds are greater than 155 miles per hour. If winds are greater than 155 miles per hour, then trees, shrubs, and signs are blown down.
   a. If winds are greater than 155 miles per hour, then there is a Category 5 hurricane.
   b. If trees, shrubs, and signs are blown down, then there is a Category 5 hurricane.
   c. no valid statement
   d. If a hurricane is Category 5, then trees, shrubs, and signs are blown down.

2. If two angles form a linear pair, then the two angles are supplementary. If two angles are supplementary, then the sum of their measures is 180.
   a. If two angles form a linear pair, then the sum of their measures is 180
   b. no valid conclusion
   c. If two angles are supplementary, then they form a linear pair.
   d. If the sum of the measures of two angles is 180, then they form a linear pair.

VISUALIZATION Name the geometric term(s) modeled by each object.

3. a car antenna
   a. two planes
   b. line and point
   c. line and plane
   d. plane and point

4. a library card
   a. line segment
   b. plane
   c. line
   d. point

5. strings
   a. lines
   b. line segments
   c. plane
   d. point
Unit 1

6. tip of pin

a. line
b. point
c. plane
d. line segment

Define each term in your own words.
7. conditional statement

8. truth value

Enter the appropriate word(s) to complete the statement.

<table>
<thead>
<tr>
<th>algebraic proof</th>
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<th>related conditionals</th>
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Choose from the terms above to complete each sentence.
9. A(n) ____________ is an educated guess based on known information.

10. The statement immediately following the word if is called the ____________ of an if-then statement.

11. The statement immediately following the word then is called the ____________ of an if-then statement.
**Unit 1**

*Indicate the answer choice that best completes the statement or answers the question.*

Refer to the figure.

**12.** Name three collinear points
   a. $S, X, M$
   b. $T, Q, P$
   c. $S, X, R$
   d. $M, X, T$

   a. No; points $N, R,$ and $S$ lie in plane $A$, but point $W$ does not.
   b. No; a line cannot be drawn through all four points.
   c. No; points $N, R,$ and $W$ lie in plane $A$, but point $S$ does not.
   d. Yes; points $N, R, S,$ and $W$ all lie in the same plane.

**14.** How many planes are shown in the figure?
   a. 7
   b. 3
   c. 6
   d. 1
15. Name a line that contains points $T$ and $P$.
   a. Line $g$, $\overrightarrow{TP}$, $\overrightarrow{TQ}$, $\overrightarrow{NP}$
   b. Line $g$, $\overrightarrow{TP}$, $\overrightarrow{TN}$, $\overrightarrow{NP}$
   c. Line $h$, $\overrightarrow{TP}$, $\overrightarrow{TN}$, $\overrightarrow{NP}$
   d. Line $S$, line $g$, $\overrightarrow{TN}$, $\overrightarrow{NP}$

16. Name the plane that contains $\overrightarrow{TN}$ and $\overrightarrow{QR}$.
   a. plane $MRN$
   b. plane $S$
   c. plane $g$
   d. plane $T$

17. Name a line that intersects the plane containing points $Q$, $N$, and $P$.
   a. Line $S$ or $\overrightarrow{RO}$
   b. Line $h$ or $\overrightarrow{RT}$
   c. Line $j$ or $\overrightarrow{MT}$
   d. Line $g$ or $\overrightarrow{PN}$

**SUMMER CAMP** Older campers who attend Woodland Falls Camp are expected to work. Campers who are juniors wait on tables.

18. Write a conditional statement in if-then form.
   a. If you are work, then you are a junior.
   b. If you wait on tables, then you are a junior.
   c. If you are an older camper, then you are a junior.
   d. If you are a junior, then you wait on tables.
Indicate whether the statement is true or false. If it is false, change the identified word(s) to make the statement true.

Determine whether each sentence is true or false. If false, replace the underlined word or phrase to make a true sentence.

19. A statement that has opposite meaning and truth value of the original statement is called the negation.

20. A postulate is a statement that has been proved.

21. A theorem is a statement that describes a fundamental relationship between the basic terms of geometry.

22. Deductive reasoning uses facts, rules, definitions, or properties to reach logical conclusions.

Indicate the answer choice that best completes the statement or answers the question.

Make a conjecture about the next item in each sequence.

23. ______

a.  

b.  

c.  

d.  

24. 12, 6, 3, 1.5, 0.75

a. –4.5

b. 0.25

c. –0.25

d. 0.375
25. $-2, 1, -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}$

   a. $\frac{1}{64}$
   b. $\frac{1}{16}$
   c. $\frac{1}{16}$
   d. $\frac{1}{64}$

26. $5, -10, 15, -20$

   a. 25
   b. 30
   c. $-25$
   d. 20

27. **ALLERGIES** Each spring, Rachel starts sneezing when the pear trees on her street blossom. She reasons that she is allergic to pear trees. Find a counterexample to Rachel’s conjecture.

   ____________________________________________________________________________

   ________________________________

   Indicate the answer choice that best completes the statement or answers the question.

   Choose the correct term to complete each sentence.

   __ 28. The ________ divides a line segment into two congruent segments.

   a. midpoint  b. angle bisector

   Make a conjecture about each value or geometric relationship.

   __ 29. Point $S$ is between $R$ and $T$.

   a. $RS + ST = RT$

   b. $RT + ST = RS$

   c. $RS - ST = RT$

   d. $RS + RT = ST$
Define each term in your own words.

30. collinear

Indicate the answer choice that best completes the statement or answers the question.

Refer to Figure 2.

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31. How many planes contain points B, L, F, and D?
   a. 1  b. 3  c. 2  d. 0

---

Figure 2

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Name: __________________________  Class: __________________  Date: ____________
Unit 1

Complete each truth table.

___ 32. 

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Indicate whether the statement is true or false. If it is false, change the identified word(s) to make the statement true.

Determine whether each sentence is true or false. If false, replace the underlined word or phrase to make a true sentence.

___ 33. Two angles are congruent if their measures have a sum of 90.

___ 34. If two rays intersect at a common endpoint, a plane is formed.
Unit 1

Indicate the answer choice that best completes the statement or answers the question.

Draw a valid conclusion from the statements, if possible. Then state whether your conclusion was drawn using the Law of Detachment or the Law of Syllogism. If no valid conclusion can be drawn, write no valid conclusion and explain your reasoning.

35. Given: If a whole number is even, then its square is divisible by 4. The number I am thinking of is an even number.
   a. The square of the number is divisible by 16. Law of Detachment.
   b. The square of the number I am thinking of is divisible by 4. Law of Syllogism.
   c. The square of the number I am thinking of is divisible by 4. Law of Detachment.
   d. no valid conclusion

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

36. If S, T, and U are collinear and ST = TU, then T is the midpoint of SU.
   a. True
   b. False; U is the midpoint of ST

Find the length of each side of the polygon for the given perimeter.

37. P = 54 mi
   a. 12 mi   b. 9 mi
   c. 6 mi   d. 3 mi
Unit 1

**Draw and label a figure for each relationship.**

38. \( \overleftrightarrow{AK} \) and \( \overleftrightarrow{CG} \) intersect at point \( M \) in plane \( T \).

   a. \hspace{1cm} b. 
   
   c. \hspace{1cm} d. 

39. Travel agents often lure customers with attractive vacation packages.

   a. Describe how conditional statements are used in vacation packages.
   b. Include an example of a conditional statement in if-then form that could be used in a vacation package.

   

Indicate the answer choice that best completes the statement or answers the question.

**Identify the hypothesis and conclusion of each conditional statement.**

40. If \( 3x + 4 = -5 \), then \( x = -3 \).

   a. H: If \( 3x + 4 = -5 \), then \( x = -3 \); C: true
   b. H: If \( 3x + 4 = -5 \), then \( x = -3 \); C: false
   c. H: \( 3x + 4 = -5 \); C: \( x = -3 \)
   d. H: \( x = -3 \); C: \( 3x + 4 = -5 \)
41. If you take a class in television broadcasting, then you will film a sporting event.
   a. H: you take a class in television broadcasting;
      C: you will film a sporting event
   b. H: you will film a sporting event;
      C: you take a class in television broadcasting
   c. H: If you take a class in television broadcasting, then you will film a sporting event.
      C: false
   d. H: If you take a class in television broadcasting, then you will film a sporting event.
      C: true

Write each statement in if-then form.

42. “Those who do not remember the past are condemned to repeat it.” (George Santayana)
   a. If you remember the past, then you are not condemned to repeat it.
   b. If you do not remember the past, then you are condemned to repeat it.
   c. If you are condemned to repeat the past, then you do not remember it.
   d. If you are condemned to repeat the past, then you will remember it.

43. Adjacent angles share a common vertex and a common side.
   a. If two angles share a common vertex, then they are adjacent.
   b. If two angles share a common vertex, then they share a common side.
   c. If two angles are adjacent, then they share a common vertex and a common side.
   d. If two angles share a common side, then they share a common vertex.

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.

44. (1) If you use a pencil you can erase mistakes.
    (2) If you can erase mistakes your paper will be neater.
    (3) If you use a pencil your paper will be neater.
   a. invalid
   b. yes; Law of Syllogism
   c. yes; Law of Detachment
Unit 1

Answer Key

1. d
2. a
3. b
4. b
5. b
6. b
7. a statement written in if-then form
8. the truth or falsity of a statement
9. conjecture
10. hypothesis
11. conclusion
12. a
13. a
14. c
15. b
16. b
17. c
18. d
19. True
20. False - theorem
21. False - postulate
22. True
23. d
24. d
25. b
26. a
27. Sample answer: Rachel could be allergic to other types of plants that blossom when the pear trees blossom.
28. a
29. a

30. points that lie on the same line

31. d

32. d

33. False - complementary

34. False - angle

35. c

36. a

37. b

38. c

39. a. Conditional statements can be used to describe how to get free tickets for children, a free rental car, or free breakfast.
   b. Sample answer: If you purchase a 2-day ticket online at the regular price, then you will get one child ticket free.

40. c

41. a

42. b

43. c

44. b