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

Logic Review

Multiple Choice

Identify the choice that best completes the statement or answers the question.

A

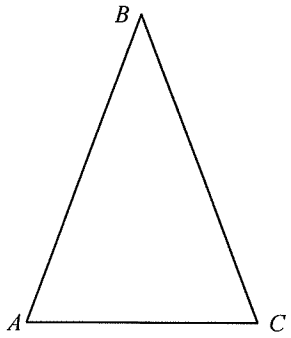
Make a conjecture about the next item in the sequence.

1. 1, 4, 16, 64, 256 ×4
   a. 1024
   b. 1025
   c. 4096
   d. 1022

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

D

2. **Given:**



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

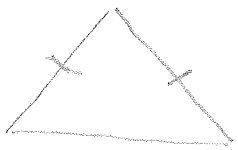
a. False; the angles are not vertical.
b. True
c. False; the angles are not complementary.
(d.) False; there is no indication of the measures of the angles.

Use the following statements to write a compound statement for the conjunction or disjunction. Then find its truth value.

p: An isosceles triangle has two congruent sides. →
q: A right angle measures 90° →
r: Four points are always coplanar.
s: A decagon has 12 sides.

B

3. $p \vee q$
   a. An isosceles triangle has two congruent sides and a right angle measures 90°; true.
   (b.) An isosceles triangle has two congruent sides or a right angle measures 90°; true.
   c. An isosceles triangle has two congruent sides or four points are always coplanar; true.
   d. An isosceles triangle has two congruent sides or a right angle measures 90°; false.



P = T

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Short Answer

4. Write the statement *All chickens have two wings* in if-then form.

If the animal is a chicken, then it has wings.

5. *If you live in Michigan, then you live in Detroit.* F

Hypothesis: You live in Michigan

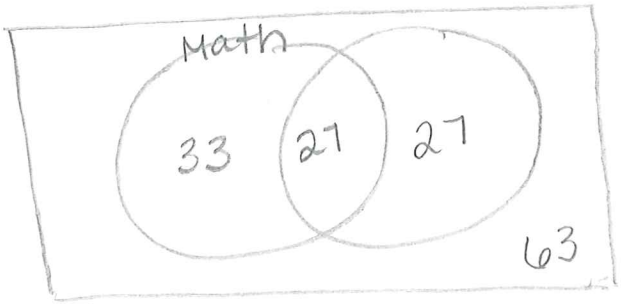
Conclusion: You live in Detroit

T Inverse: If you don't live in Michigan, then you don't live in detroit.

F Contrapositive: If you don't live in Detroit, then you don't live in Michigan

T Converse: If you live in Detroit, then you live in MI.

6. In a group of 150 students, 60 students joined the math club, 54 students joined theater, and 27 students joined both. Draw a Venn diagram to represent the data.



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7. **Use the truth table.**

p	q	$p \wedge q$	$p \vee q$
T	T	T	T
T	F	F	T
F	T	F	T
F	F	F	F

Complete the truth table.

8.

p	q	r	$\sim p$	$r \wedge \sim p$
T	T	T	F	F
T	T	F	F	F
T	F	T	F	F
T	F	F	F	F
F	T	T	T	T
F	T	F	T	F
F	F	T	T	T
F	F	F	T	F

9. **Tell whether the statement is a biconditional.**

a. I will work after school only if I have the time.

To be true conditional & converse must be true

NO

b. An angle is called a right angle if and only if it measures 90.

YES

If it is called a right $\angle$ then it is 90°

If the angle is 90 then it is called a Right $\angle$ TRUE

c. Two segments are congruent if and only if they have the same length.

If 2 seg are $\cong$ then they have the same length (T)

YES

If 2 seg have the same length then they are $\cong$ (T)

10.

In Exercises 4–8, match the conditional statement with the property of equality.

C **4.** If $JK = PQ$ and $PQ = ST$, then $JK = ST$.

A **5.** If $m\angle S = 30°$, then $5° + m\angle S = 35°$.

B **6.** If $ST = 2$ and $SU = ST + 3$, then $SU = 5$.

E **7.** If $m\angle K = 45°$, then $3(m\angle K) = 135°$.

D **8.** If $m\angle P = m\angle Q$, then $m\angle Q = m\angle P$.

A. Addition property

B. Substitution property

C. Transitive property

D. Symmetric property

E. Multiplication property

11. Each of the following statements is true. Write the converse of each statement and decide whether the converse is true or false. If the converse is true, combine it with the original statement to form a true biconditional statement. If the converse is false, state a counterexample.

a. If two points lie in a plane, then the line containing them lies in the plane.

Converse: If the line containing 2 pts lies in the plane, then the 2pts lie in the plane. TRUE

Biconditional: Two points lie in a plane iff the line containing them lies in the plane

b. If a number ends in 0, then the number is divisible by 5.

Converse: If a number is divisible by 5, then the number ends in a zero. False

Counterexample:

15 is divisible by 5 but doesn't end in zero.

12. **Rewrite the biconditional statement as a conditional statement and its converse.**

d. The ceiling fan runs if and only if the light switch is on.

Cond: If the ceiling fan runs, then the light switch is on

Converse: If the light switch is on, then the ceiling fan runs.

e. You scored a touchdown if and only if the football crossed the goal line.

Conditional: If you scored a touchdown, then the ball crossed the line.

Converse: If the ball crossed the goal line, then you scored a touchdown

f. The expression $3x + 4$ is equal to 10 if and only if x is 2.

Conditional: If the expression $3x+4$ is equal to 10, then x is 2.

Converse: If x is 2, then the expression $3x+4$ is equal to 10.