G.CO.C.9: Conditional Statements 1a

1 Which statement is logically equivalent to "If I eat, then I live"?
   1) If I live, then I eat.
   2) If I eat, then I do not live.
   3) I live if and only if I eat.
   4) If I do not live, then I do not eat.

2 Which statement is logically equivalent to "If I did not eat, then I am hungry"?
   1) If I am not hungry, then I did not eat.
   2) If I did not eat, then I am not hungry.
   3) If I am not hungry, then I did eat.
   4) If I am hungry, then I did eat.

3 Which statement is logically equivalent to "If the team has a good pitcher, then the team has a good season"?
   1) If the team does not have a good season, then the team does not have a good pitcher.
   2) If the team does not have a good pitcher, then the team does not have a good season.
   3) If the team has a good season, then the team has a good pitcher.
   4) The team has a good pitcher and the team does not have a good season.

4 Given the true statement: "If a person is eligible to vote, then that person is a citizen." Which statement must also be true?
   1) Kayla is not a citizen; therefore, she is not eligible to vote.
   2) Juan is a citizen; therefore, he is eligible to vote.
   3) Marie is not eligible to vote; therefore, she is not a citizen.
   4) Morgan has never voted; therefore, he is not a citizen.

5 Which statement is logically equivalent to "If it is Saturday, then I am not in school"?
   1) If I am not in school, then it is Saturday.
   2) If it is not Saturday, then I am in school.
   3) If I am in school, then it is not Saturday.
   4) If it is Saturday, then I am in school.

6 Which statement is logically equivalent to "If a triangle is an isosceles triangle, then it has two congruent sides"?
   1) If a triangle does not have two congruent sides, then it is an isosceles triangle.
   2) If a triangle does not have two congruent sides, then it is not an isosceles triangle.
   3) If a triangle is not an isosceles triangle, then it has two congruent sides.
   4) If a triangle is an isosceles triangle, then it does not have two congruent sides.

7 Which statement is logically equivalent to "If I am in a mathematics class, then I am having fun"?
   1) If I am not in a mathematics class, then I am not having fun.
   2) If I am having fun, then I am in a mathematics class.
   3) If I am not having fun, then I am not in a mathematics class.
   4) If I am in a mathematics class, then I am not having fun.

8 Which statement is logically equivalent to the statement "If you are an elephant, then you do not forget"?
   1) If you do not forget, then you are an elephant.
   2) If you do not forget, then you are not an elephant.
   3) If you are an elephant, then you forget.
   4) If you forget, then you are not an elephant.

9 Which statement is logically equivalent to the statement "If Corey worked last summer, he buys a car"?
   1) If Corey does not buy a car, he did not work last summer.
   2) If Corey buys a car, he worked last summer.
   3) If Corey did not work last summer, he does not buy a car.
   4) If Corey buys a car, he did not work last summer.

10   Which statement is logically equivalent to "If it is warm, then I go swimming"
1)   If I go swimming, then it is warm.
2)   If it is warm, then I do not go swimming.
3)   If I do not go swimming, then it is not warm.
4)   If it is not warm, then I do not go swimming.

11   "If Tom and Mary are classmates, then they go to the same school." Which statement below is logically equivalent?
1)   If Mary and Tom do not go to the same school, then they are not classmates.
2)   If Mary and Tom are not classmates, then they do not go to the same school.
3)   If Mary and Tom go to the same school, then they are classmates.
4)   If Mary and Tom go to the same school, then they are not classmates.

12   Which statement is logically equivalent to "If I sleep, then I will not eat"?
1)   If I do not sleep, then I will eat.
2)   If I eat, then I will not sleep.
3)   If I eat, then I will sleep.
4)   If I do not eat, then I will sleep.

13   A conditional statement is always logically equivalent to its
1)   contrapositive
2)   converse
3)   conjunction
4)   inverse

14   Consider the relationship between the two statements below.
$$\text{If } \sqrt{16+9} \neq 4+3, \text{ then } 5 \neq 4+3$$
$$\text{If } \sqrt{16+9} = 4+3, \text{ then } 5 = 4+3$$
These statements are
1)   inverses
2)   converses
3)   contrapositives
4)   biconditionals

15   Write a statement that is logically equivalent to the statement "If two sides of a triangle are congruent, the angles opposite those sides are congruent." Identify the new statement as the converse, inverse, or contrapositive of the original statement.

16   In the spaces provided below, write the converse, the inverse, and the contrapositive of the statement "If I run, then I am tired."

Converse:

Inverse:

Contrapositive:

17   Given the statement: "If I live in Albany, then I am a New Yorker." In the spaces provided below, write the inverse, the converse, and the contrapositive of this statement.

Inverse:

Converse:

Contrapositive:

Which conditional is logically equivalent to its original statement?

inverse   converse   contrapositive

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Answer Section

  1 ANS: 4   REF: 060112a
  2 ANS: 3   REF: 080104a
  3 ANS: 1   REF: 010220a
  4 ANS: 1   REF: 010308a
  5 ANS: 3   REF: 060308a
  6 ANS: 2   REF: 060405a
  7 ANS: 3   REF: 010930a
  8 ANS: 4   REF: 010513a
  9 ANS: 1   REF: 080629a
10 ANS: 3   REF: 081026ge
11 ANS: 1   REF: spring9812a
12 ANS: 2   REF: 080829a
13 ANS: 1   REF: 060823a
14 ANS: 1   REF: 011320ge
15 ANS:
      Contrapositive-If two angles of a triangle are not congruent, the sides opposite those angles are not congruent.

      REF: fall0834ge
16 ANS:
      INVERSE: If I do not run, then I am not tired. CONVERSE: If I am tired, then I run. CONTRAPOSITIVE: If I am not tired, then I do not run.

      REF: 010837a
17 ANS:
      INVERSE: If I do not live in Albany, then I am not a New Yorker. CONVERSE: If I am a New Yorker, then I live in Albany. CONTRAPOSITIVE: If I am not a New Yorker, then I do not live in Albany. The contrapositive is logically equivalent.

      REF: 080739a