

**G.CO.C.9: Inverse, Converse, Contrapositive and Conditional Statements 1a**

- 1 What is the inverse of the statement "If two triangles are not similar, their corresponding angles are not congruent"?
  - 1) If two triangles are similar, their corresponding angles are not congruent.
  - 2) If corresponding angles of two triangles are not congruent, the triangles are not similar.
  - 3) If two triangles are similar, their corresponding angles are congruent.
  - 4) If corresponding angles of two triangles are congruent, the triangles are similar.
- 2 What is the inverse of the statement "If it is sunny, I will play baseball"?
  - 1) If I play baseball, then it is sunny.
  - 2) If it is not sunny, I will not play baseball.
  - 3) If I do not play baseball, then it is not sunny.
  - 4) I will play baseball if and only if it is sunny.
- 3 What is the inverse of the statement "If Mike did his homework, then he will pass this test"?
  - 1) If Mike passes this test, then he did his homework.
  - 2) If Mike does not pass this test, then he did not do his homework.
  - 3) If Mike does not pass this test, then he only did half his homework.
  - 4) If Mike did not do his homework, then he will not pass this test.
- 4 What is the inverse of the statement "If Julie works hard, then she succeeds"?
  - 1) If Julie succeeds, then she works hard.
  - 2) If Julie does not succeed, then she does not work hard.
  - 3) If Julie works hard, then she does not succeed.
  - 4) If Julie does not work hard, then she does not succeed.
- 5 What is the inverse of the statement "If I do not buy a ticket, then I do not go to the concert"?
  - 1) If I buy a ticket, then I do not go to the concert.
  - 2) If I buy a ticket, then I go to the concert.
  - 3) If I go to the concert, then I buy a ticket.
  - 4) If I do not go to the concert, then I do not buy a ticket.
- 6 Which statement is the inverse of "If the waves are small, I do not go surfing"?
  - 1) If the waves are not small, I do not go surfing.
  - 2) If I do not go surfing, the waves are small.
  - 3) If I go surfing, the waves are not small.
  - 4) If the waves are not small, I go surfing.
- 7 Which statement is the inverse of "If  $x + 3 = 7$ , then  $x = 4$ "?
  - 1) If  $x = 4$ , then  $x + 3 = 7$ .
  - 2) If  $x \neq 4$ , then  $x + 3 \neq 7$ .
  - 3) If  $x + 3 \neq 7$ , then  $x \neq 4$ .
  - 4) If  $x + 3 = 7$ , then  $x \neq 4$ .
- 8 What is the converse of the statement "If it is sunny, I will go swimming"?
  - 1) If it is not sunny, I will not go swimming.
  - 2) If I do not go swimming, then it is not sunny.
  - 3) If I go swimming, it is sunny.
  - 4) I will go swimming if and only if it is sunny.
- 9 Which statement is the converse of "If it is a 300 ZX, then it is a car"?
  - 1) If it is not a 300 ZX, then it is not a car.
  - 2) If it is not a car, then it is not a 300 ZX.
  - 3) If it is a car, then it is a 300 ZX.
  - 4) If it is a car, then it is not a 300 ZX.
- 10 What is the converse of the statement "If it is Sunday, then I do not go to school"?
  - 1) If I do not go to school, then it is Sunday.
  - 2) If it is not Sunday, then I do not go to school.
  - 3) If I go to school, then it is not Sunday.
  - 4) If it is not Sunday, then I go to school.

- 11 What is the converse of the statement "If Alicia goes to Albany, then Ben goes to Buffalo"?
- 1) If Alicia does not go to Albany, then Ben does not go to Buffalo.
  - 2) Alicia goes to Albany if and only if Ben goes to Buffalo.
  - 3) If Ben goes to Buffalo, then Alicia goes to Albany.
  - 4) If Ben does not go to Buffalo, then Alicia does not go to Albany.
- 12 What is the converse of the statement "If the Sun rises in the east, then it sets in the west"?
- 1) If the Sun does not set in the west, then it does not rise in the east.
  - 2) If the Sun does not rise in the east, then it does not set in the west.
  - 3) If the Sun sets in the west, then it rises in the east.
  - 4) If the Sun rises in the west, then it sets in the east.
- 13 What is the converse of the statement "If Bob does his homework, then George gets candy"?
- 1) If George gets candy, then Bob does his homework.
  - 2) Bob does his homework if and only if George gets candy.
  - 3) If George does not get candy, then Bob does not do his homework.
  - 4) If Bob does not do his homework, then George does not get candy.
- 14 Which statement is the converse of "If the sum of two angles is  $180^\circ$ , then the angles are supplementary"?
- 1) If two angles are supplementary, then their sum is  $180^\circ$ .
  - 2) If the sum of two angles is not  $180^\circ$ , then the angles are not supplementary.
  - 3) If two angles are not supplementary, then their sum is not  $180^\circ$ .
  - 4) If the sum of two angles is not  $180^\circ$ , then the angles are supplementary.
- 15 What is the converse of the statement "If  $x$  is an even integer, then  $(x + 1)$  is an odd integer"?
- 1)  $x$  is not an even integer if and only if  $(x + 1)$  is not an odd integer.
  - 2)  $x$  is an even integer if and only if  $(x + 1)$  is an odd integer.
  - 3) If  $(x + 1)$  is not an odd integer, then  $x$  is not an even integer.
  - 4) If  $(x + 1)$  is an odd integer, then  $x$  is an even integer.
- 16 What is the converse of the statement "If  $a^2 + b^2 = c^2$ , then  $\triangle ABC$  is a right triangle"?
- 1) If  $\triangle ABC$  is a right triangle, then  $a^2 + b^2 = c^2$ .
  - 2)  $a^2 + b^2 = c^2$  if, and only if,  $\triangle ABC$  is a right triangle.
  - 3) If  $\triangle ABC$  is not a right triangle, then  $a^2 + b^2 = c^2$ .
  - 4) If  $a^2 + b^2 = c^2$ , then  $\triangle ABC$  is not a right triangle.
- 17 What is the converse of "If an angle measures 90 degrees, then it is a right angle"?
- 1) If an angle is a right angle, then it measures 90 degrees.
  - 2) An angle is a right angle if it measures 90 degrees.
  - 3) If an angle is not a right angle, then it does not measure 90 degrees.
  - 4) If an angle does not measure 90 degrees, then it is not a right angle.
- 18 Lines  $m$  and  $n$  are in plane  $\mathcal{A}$ . What is the converse of the statement "If lines  $m$  and  $n$  are parallel, then lines  $m$  and  $n$  do not intersect"?
- 1) If lines  $m$  and  $n$  are not parallel, then lines  $m$  and  $n$  intersect.
  - 2) If lines  $m$  and  $n$  are not parallel, then lines  $m$  and  $n$  do not intersect
  - 3) If lines  $m$  and  $n$  intersect, then lines  $m$  and  $n$  are not parallel.
  - 4) If lines  $m$  and  $n$  do not intersect, then lines  $m$  and  $n$  are parallel.

- 19 The converse of the statement "If a triangle has one right angle, the triangle has two acute angles" is
- 1) If a triangle has two acute angles, the triangle has one right angle.
  - 2) If a triangle has one right angle, the triangle does not have two acute angles.
  - 3) If a triangle does not have one right angle, the triangle does not have two acute angles.
  - 4) If a triangle does not have two acute angles, the triangle does not have one right angle.
- 20 What is the contrapositive of the statement, "If I am tall, then I will bump my head"?
- 1) If I bump my head, then I am tall.
  - 2) If I do not bump my head, then I am tall.
  - 3) If I am tall, then I will not bump my head.
  - 4) If I do not bump my head, then I am not tall.
- 21 What is the contrapositive of the statement "If I study, then I pass the test"?
- 1) I pass the test if I study.
  - 2) If I do not study, then I do not pass the test.
  - 3) If I do not pass the test, then I do not study.
  - 4) If I pass the test, then I study.
- 22 Given the statement, "If a number has exactly two factors, it is a prime number," what is the contrapositive of this statement?
- 1) If a number does not have exactly two factors, then it is not a prime number.
  - 2) If a number is not a prime number, then it does not have exactly two factors.
  - 3) If a number is a prime number, then it has exactly two factors.
  - 4) A number is a prime number if it has exactly two factors.
- 23 Given: "If a polygon is a triangle, then the sum of its interior angles is  $180^\circ$ ." What is the contrapositive of this statement?
- 1) "If the sum of the interior angles of a polygon is not  $180^\circ$ , then it is not a triangle."
  - 2) "A polygon is a triangle if and only if the sum of its interior angles is  $180^\circ$ ."
  - 3) "If a polygon is not a triangle, then the sum of the interior angles is not  $180^\circ$ ."
  - 4) "If the sum of the interior angles of a polygon is  $180^\circ$ , then it is a triangle."
- 24 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.
- 25 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.
- 26 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.

- 27 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.
- 28 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.
- 29 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.
- 30 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.
- 31 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.
- 32 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.
- 33 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.
- 34 "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.
- 35 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.

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

- 37 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
- 38 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.
- 39 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:

- 40 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: 3	REF: 011028ge
2	ANS: 2	REF: 060006a
3	ANS: 4	REF: 010303a
4	ANS: 4	REF: 060317a
5	ANS: 2	REF: 080416a
6	ANS: 4	REF: 010616a
7	ANS: 3	REF: 061526ge
8	ANS: 3	REF: 080014a
9	ANS: 3	REF: 080116a
10	ANS: 1	REF: 060520a
11	ANS: 3	REF: 080521a
12	ANS: 3	REF: 060717a
13	ANS: 1	REF: 061009ge
14	ANS: 1	REF: 010415a
15	ANS: 4	REF: 060816a
16	ANS: 1	REF: 080813a
17	ANS: 1	REF: 061314ge
18	ANS: 4	REF: 081318ge
19	ANS: 1	REF: 011605ge
20	ANS: 4	REF: 060913ge
21	ANS: 3	REF: 080427a
22	ANS: 2	REF: 011517ge
23	ANS: 1	REF: 081513ge
24	ANS: 4	REF: 060112a
25	ANS: 3	REF: 080104a
26	ANS: 1	REF: 010220a
27	ANS: 1	REF: 010308a
28	ANS: 3	REF: 060308a
29	ANS: 2	REF: 060405a
30	ANS: 3	REF: 010930a
31	ANS: 4	REF: 010513a
32	ANS: 1	REF: 080629a
33	ANS: 3	REF: 081026ge
34	ANS: 1	REF: spring9812a
35	ANS: 2	REF: 080829a
36	ANS: 1	REF: 060823a
37	ANS: 1	REF: 011320ge
38	ANS:	

Contrapositive-If two angles of a triangle are not congruent, the sides opposite those angles are not congruent.

REF: fall0834ge

39 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

40 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