

G.CO.C.9: Compound Statements

- 1 The statement " x is a multiple of 3, and x is an even integer" is true when x is equal to
 - 1) 9
 - 2) 8
 - 3) 3
 - 4) 6
- 2 The statement " x is *not* the square of an integer and x is a multiple of 3" is true when x is equal to
 - 1) 9
 - 2) 18
 - 3) 32
 - 4) 36
- 3 Stan was trying to guess Melanie's age. She told him her age was an even number and a multiple of three. What could be Melanie's age?
 - 1) 10
 - 2) 12
 - 3) 15
 - 4) 16
- 4 What is the smallest integer greater than 1 that is both the square of an integer and the cube of an integer?
 - 1) 8
 - 2) 9
 - 3) 36
 - 4) 64
- 5 The statement " $x \geq 4$ and $2x - 4 < 6$ " is true when x is equal to
 - 1) 1
 - 2) 10
 - 3) 5
 - 4) 4
- 6 Given the true statements: " t is a multiple of 3" and " t is even." What could be a value of t ?
 - 1) 8
 - 2) 9
 - 3) 15
 - 4) 24
- 7 The statement " $a > 2$ and $a < 5$ " is true when a is equal to
 - 1) 10
 - 2) 2
 - 3) 3
 - 4) 5
- 8 Seth is thinking of a number between 20 and 30. The number is prime and not more than 2 away from a perfect square. What is the number?
- 9 The statement " $x > 5$ or $x < 3$ " is *false* when x is equal to
 - 1) 1
 - 2) 2
 - 3) 7
 - 4) 4
- 10 Mary says, "The number I am thinking of is divisible by 2 or is divisible by 3." Mary's statement is false if the number she is thinking of is
 - 1) 6
 - 2) 8
 - 3) 11
 - 4) 15
- 11 The statement " x is divisible by 5 or x is divisible by 4" is false when x equals
 - 1) 10
 - 2) 16
 - 3) 20
 - 4) 27
- 12 The statement "Maya plays on the basketball team or Maya joins the ski club" is false. Which statement is true?
 - 1) Maya plays on the basketball team and Maya joins the ski club.
 - 2) Maya plays on the basketball team and Maya does not join the ski club.
 - 3) Maya does not play on the basketball team and Maya joins the ski club.
 - 4) Maya does not play on the basketball team and Maya does not join the ski club.

- 13 Mark says, "The number I see is odd." Jan says, "That same number is prime." The teacher says, "Mark is correct or Jan is correct." Some integers would make the teacher's statement true while other integers would make it false. Give and explain *one* example of when the teacher's statement is true. Give and explain *one* example of when the teacher's statement is false.
- 14 Given: Two is an even integer or three is an even integer.
Determine the truth value of this disjunction.
Justify your answer.
- 15 The statement "If x is divisible by 8, then it is divisible by 6" is false if x equals
- 1) 6
 - 2) 14
 - 3) 32
 - 4) 48
- 16 The statement "If x is prime, then it is odd" is *false* when x equals
- 1) 1
 - 2) 2
 - 3) 3
 - 4) 4
- 17 Given the statement: "If x is a rational number, then \sqrt{x} is irrational." Which value of x makes the statement false?
- 1) $\frac{3}{2}$
 - 2) 2
 - 3) 3
 - 4) 4
- 18 Which statement has the same truth value as the statement "If a quadrilateral is a square, then it is a rectangle"?
- 1) If a quadrilateral is a rectangle, then it is a square.
 - 2) If a quadrilateral is a rectangle, then it is not a square.
 - 3) If a quadrilateral is not a square, then it is not a rectangle.
 - 4) If a quadrilateral is not a rectangle, then it is not a square.
- 19 What is true about the statement "If two angles are right angles, the angles have equal measure" and its converse "If two angles have equal measure then the two angles are right angles"?
- 1) The statement is true but its converse is false.
 - 2) The statement is false but its converse is true.
 - 3) Both the statement and its converse are false.
 - 4) Both the statement and its converse are true.
- 20 Given the statement: "If two sides of a triangle are congruent, then the angles opposite these sides are congruent." Given the converse of the statement: "If two angles of a triangle are congruent, then the sides opposite these angles are congruent." What is true about this statement and its converse?
- 1) Both the statement and its converse are true.
 - 2) Neither the statement nor its converse is true.
 - 3) The statement is true but its converse is false.
 - 4) The statement is false but its converse is true.
- 21 Given the statement: "If two lines are cut by a transversal so that the corresponding angles are congruent, then the lines are parallel." What is true about the statement and its converse?
- 1) The statement and its converse are both true.
 - 2) The statement and its converse are both false.
 - 3) The statement is true, but its converse is false.
 - 4) The statement is false, but its converse is true.
- 22 Which statement is an example of a biconditional statement?
- 1) If Craig has money, he buys a car.
 - 2) Craig buys a car if and only if he has money.
 - 3) Craig has money or he buys a car.
 - 4) Craig has money and he buys a car.

- 23 Which statement is expressed as a biconditional?
- 1) Two angles are congruent if they have the same measure.
 - 2) If two angles are both right angles, then they are congruent.
 - 3) Two angles are congruent if and only if they have the same measure.
 - 4) If two angles are congruent, then they are both right angles.
- 24 Given the statement: "A right angle measures 90° ." How is this statement written as a biconditional?
- 1) If an angle is a right angle, then it measures 90° .
 - 2) An angle is a right angle if, and only if, it measures 90° .
 - 3) An angle measures 90° and it is a right angle.
 - 4) If an angle does not measure 90° , then it is not a right angle.
- 25 Which compound statement is true?
- 1) A triangle has three sides and a quadrilateral has five sides.
 - 2) A triangle has three sides if and only if a quadrilateral has five sides.
 - 3) If a triangle has three sides, then a quadrilateral has five sides.
 - 4) A triangle has three sides or a quadrilateral has five sides.
- 26 Which compound statement is true?
- 1) A square has four sides or a hexagon has eight sides.
 - 2) A square has four sides and a hexagon has eight sides.
 - 3) If a square has four sides, then a hexagon has eight sides.
 - 4) A square has four sides if and only if a hexagon has eight sides.
- 27 If $x = 3$, which statement is false?
- 1) x is prime and x is odd.
 - 2) x is odd or x is even.
 - 3) x is not prime and x is odd.
 - 4) x is odd and $2x$ is even.
- 28 Given the true statements: "Jason goes shopping or he goes to the movies" and "Jason does not go to the movies." Which statement must also be true?
- 1) Jason stays home.
 - 2) Jason goes shopping.
 - 3) Jason does not go shopping.
 - 4) Jason does not go shopping and he does not go to the movies.
- 29 Given the true statements:
"Rob plays basketball or tennis."
"Rob does not play tennis."
Which statement must also be true?
- 1) Rob plays basketball.
 - 2) Rob does not play basketball.
 - 3) Rob does not play basketball, and he does not play tennis.
 - 4) Rob plays football.
- 30 Bob and Ray are describing the same number. Bob says, "The number is a positive even integer less than or equal to 20." Ray says, "The number is divisible by 4." If Bob's statement is true and Ray's statement is false, what are all the possible numbers?
- 31 Given the true statement "John is not handsome" and the false statement "John is handsome or smart." Determine the truth value for the statement "John is smart."

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Answer Section

1 ANS: 4 REF: 081101ge

2 ANS: 2
18 is *not* the square of an integer and is a multiple of 3.

REF: 060416a

3 ANS: 2
12 is an even number and a multiple of three.

REF: 010501a

4 ANS: 4
 $8^2 = 4^3 = 64$

REF: 080120a

5 ANS: 4 REF: 010706a

6 ANS: 4
24 is a multiple of 3 and is even.

REF: 080701a

7 ANS: 3 REF: 010803a

8 ANS:
23. 23 is prime and not more than 2 away from a perfect square.

REF: 010221a

9 ANS: 4 REF: 081505ge

10 ANS: 3
For the disjunction to be a false statement, both parts of the statement must be false. 11 is not divisible by 2 and not divisible by 3.

REF: 010003a

11 ANS: 4
For the disjunction to be a false statement, both parts of the statement must be false. 27 is not divisible by 5 and not divisible by 4.

REF: 080505a

12 ANS: 4
For the disjunction to be a false statement, both parts of the statement must be false. Maya does not play on the basketball team and Maya does not join the ski club.

REF: 080819a

13 ANS:
For the teacher's disjunction to be true, either Mark, Jan or both must be correct. Numbers that are either odd or prime include 2, 3, 5, 7, 9, For the teacher's disjunction to be false, both Mark and Jan must be incorrect. Numbers that are neither odd nor prime include 4, 6, 8, 10,

REF: 010129a

- 14 ANS:
True. The first statement is true and the second statement is false. In a disjunction, if either statement is true, the disjunction is true.
- REF: 060933ge
- 15 ANS: 3
For a conditional to be false, the first operand must be true and the second operand must be false. 32 is divisible by 8 and not divisible by 6.
- REF: 069902a
- 16 ANS: 2
For a conditional to be false, the first operand must be true and the second operand must be false. 2 is prime and not odd.
- REF: 060517a
- 17 ANS: 4
For a conditional to be false, the first operand must be true and the second operand must be false. 4 is a rational number and $\sqrt{4}$ is not irrational.
- REF: 060614a
- 18 ANS: 4 REF: 061423ge
- 19 ANS: 1 REF: 089912a
- 20 ANS: 1 REF: 010112a
- 21 ANS: 1 REF: 080205a
- 22 ANS: 2 REF: 010923a
- 23 ANS: 3 REF: 010627a
- 24 ANS: 2 REF: 060730a
- 25 ANS: 4 REF: 011118ge
- 26 ANS: 1 REF: 081421ge
- 27 ANS: 3
For the conjunction, “ x is not prime and x is odd,” to be a false statement, at least one part of the statement must be false. If $x = 3$, x is prime.
- REF: 060622a
- 28 ANS: 2
For the disjunction, “Jason goes shopping or he goes to the movies,” to be a true statement, at least one part of the statement must be true. Since the statement “Jason does not go to the movies” is true, “Jason goes shopping” must also be true.
- REF: 010407a
- 29 ANS: 1
For the disjunction, “Rob plays basketball or tennis,” to be a true statement, at least one part of the statement must be true. Since the statement “Rob does not play tennis” is true, “Rob plays basketball” must also be true.
- REF: 010901a

30 ANS:

2, 6, 10, 14 and 18 are positive even integers less than or equal to 20, and not divisible by 4.

REF: 089928a

31 ANS:

False. For the disjunction, "John is handsome or smart," to be a false statement, both parts of the statement must be false. Therefore, the statement "John is smart" is false.

REF: 060221a