

Geometry

2.4 Deductive Reasoning

Name _____

Date _____ Hour _____

For questions 1 – 8, determine whether the stated conclusion is valid based on the given information. If not, write invalid. Explain your choice.

If two numbers are odd, then their sum is even.

1) Given: The sum of two numbers is 22.

Conclusion: The two numbers are odd.

2) Given: The numbers are 5 and 7.

Conclusion: The sum is even.

3) Given: 11 and 23 are added together.

Conclusion: The sum of 11 and 23 is even.

4) Given: The numbers are 2 and 6.

Conclusion: The sum is odd.

If three points are noncollinear, then they determine a plane.

5) Given: A, B, and C are noncollinear.

Conclusion: A, B, and C determine a plane.

6) Given: E, F, and G lie in plane M.

Conclusion: E, F, and G are noncollinear.

7) Given: P and Q lie on a line.

Conclusion: P and Q determine a plane.

8) Given: $\triangle XYZ$

Conclusion: X, Y, and Z determine a plane.

For questions 9 – 12, use the Law of Syllogism to determine whether a valid conclusion can be reached from each set of statements. If a valid conclusion is possible, write it. If not, write no conclusion.

9) If you interview for a job, then you wear a suit.

If you interview for a job, then you will be offered that job.

10) If the measure of an angle is less than 90, then it is acute.

If an angle is acute, then the angle is not obtuse.

11) If X is the midpoint of segment YZ, then $YX = XZ$.

If the measures of two segments are equal, then they are congruent.

12) If two lines intersect to form a right angle, then they are perpendicular.

Lines l and m are perpendicular.

For questions 13 – 16, determine if statement (c) follows from statements (a) and (b) by the Law of Detachment or the Law of Syllogism or it does not follow.

- 13) a) Ballet dancers like classical music.
b) If you like classical music, then you enjoy the opera.
c) If you are a ballet dancer, then you enjoy the opera.
- 14) a) If the measure of an angle is greater than 90, then it is obtuse.
b) $m\angle ABC > 90$.
c) $\angle ABC$ is obtuse.
- 15) a) Vertical angles are congruent.
b) $\angle 3 \cong \angle 5$
c) $\angle 3$ and $\angle 5$ are vertical angles.
- 16) a) If you drive safely, then you can avoid accidents.
b) Keaton drives safely.
c) Keaton can avoid accidents.

17) From our experience in this community we know of some consistently scheduled events. Can you supply the conclusion for this beginning conditional?

If you are in Eureka at 10:00 A.M. on the first Tuesday of the month, then ...

Marketing uses if-then statements in advertisements to promote products or services. An ad for a car repair shop reads, "***If you're looking for fast and reliable car repair, visit AutoCare.***"

- 18) Write the converse of this conditional.
- 19) What do you think the advertiser wants people to conclude about AutoCare?
- 20) Does the advertisement say that AutoCare is fast and reliable?

21) Write what you can assume about the segments or angles pictured.

