Conditional Statements

Conditional statement – a statement that can be written in if-then form

If ______hypothesis______, then _______conclusion__________.

Example 1: Identify Hypothesis and conclusion

a. If points A, B, and C lie on line l, then they are collinear.
   Hypothesis: ______points A, B, and C lie on line__________
   Conclusion: ______they are collinear________________________

b. The Tigers will play in the tournament if they win their next game.
   Hypothesis: ______the Tigers win their next game____________________
   Conclusion: ______they will play in the tournament________________________

Example 2: Write a conditional in if-then form

a. An angle with a measure greater than 90 is an obtuse angle.
   Hypothesis: ______an angle has a measure greater than 90_____________________
   Conclusion: ______it is an obtuse angle____________________________
   Write if-then form: ______If an angle has a measure greater than 90, then it is an obtuse angle.

b. The length of the course for an in-line skating marathon is 26.2 miles.
   Hypothesis: ______a course is for an in-line skating marathon____________________
   Conclusion: ______it is 26.2 miles_____________________________
   Write if-then form: ______If a course is for an in-line skating marathon, then it is 26.2 miles.
Truth Value of Conditional Statements

Example: Determine the truth value (True or False) of each statement for the set of conditions.

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\begin{align*}
\text{If you get } 100\% \text{ on your test, then your teacher will give you an } \text{A}. \\
\text{Hypothesis} & \quad \text{Conclusion} \\
\text{a. You get } 100\%; \text{ your teacher gives you an } \text{A.} & \quad \text{True} \\
\text{True} & \quad \text{True} \\
\text{b. You get a } 100\%; \text{ your teacher gives you a } \text{B.} & \quad \text{False} \\
\text{True} & \quad \text{False} \\
\text{Because it doesn't match the original statement} \\
\text{c. You get } 98\%; \text{ your teacher gives you an } \text{A.} & \quad \text{True} \\
\text{False} & \quad \text{True} \\
\text{Because the hypothesis is false, you don't know what will happen, it could be true} \\
\text{d. You get } 85\%; \text{ your teacher gives you a } \text{B.} & \quad \text{True} \\
\text{False} & \quad \text{False} \\
\text{Because the hypothesis is false, it could happen, we don't know.} \\
\end{align*}
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Related Conditional Statements: Every conditional statement involves two scenarios (hypothesis and conclusion). Switching and/or negating these scenarios creates three related conditional statements (converse, inverse, and contrapositive).

Original Statement: If you live in Salem NH, then you live in the United States. (True)

Converse: switch the hypothesis and conclusion

If you live in the United States, then you live in Salem, NH. False – you could live in Nashua, NH

Inverse: negate (make “not” or the opposite) the hypothesis AND the conclusion.

If you don’t live in Salem, NH, then you don’t live in the United States. False – you could live in Massachusetts.

Contrapositive: negate AND switch the hypothesis and conclusion

If you don’t live in the Uniteded States, then you don’t live in Salem, NH. True