Classroom Exercises

1. State the contrapositive of each statement.
   a. If I can sing, then you can dance.
   b. If you can't play baseball, then I can't ride a horse.
   c. If $x = 4$, then $x^2 - 5 = 11$.
   d. If $y < 3$, then $y \neq 4$.
   e. If a polygon is a triangle, then the sum of the measures of its angles is 180.
2. State the inverse of each statement in Exercise 1.
3. A certain conditional is true. Must its converse be true? Must its inverse be true? Must its contrapositive be true?
4. A certain conditional is false. Must its converse be false? Must its inverse be false? Must its contrapositive be false?

Classify each conditional as true or false. Then state its inverse and contrapositive, and classify each of these as true or false.

5. If a triangle is equilateral, then it is equiangular.
6. If $\angle A$ is acute, then $m\angle A \neq 100$.
7. If a triangle is not isosceles, then it is not equilateral.
8. If two planes do not intersect, then they are parallel.

Express each statement in if-then form.

9. All squares are rhombuses.
10. No trapezoids are equiangular.
11. All marathoners have stamina.
12. Suppose "All marathoners have stamina" is a true conditional. What, if anything, can you conclude from each additional statement? If no conclusion is possible, say so.
    a. Nick is a marathoner.
    b. Heidi has stamina.
    c. Mimi does not have stamina.
    d. Arlo is not a marathoner.

Written Exercises

Write (a) the contrapositive and (b) the inverse of each statement.

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1. If $n = 17$, then $4n = 68$.
2. If those are red and white, then this is blue.
3. If x is not even, then $x + 1$ is not odd.
4. If Abby is not here, then she is not well.