

Practice C

For use with pages 87–95

Using p and q below, write the symbolic statement in words. Assume p and q are true. Decide if each symbolic statement is *true* or *false*.

p : The value of x is -4 . q : $3x + 2 = -10$

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|--------------------------------|----------------------|--------------------------------|
| 1. $\sim p$ | 2. $\sim q$ | 3. $q \rightarrow p$ |
| 4. $\sim q \rightarrow \sim p$ | 5. $p \rightarrow q$ | 6. $\sim p \rightarrow \sim q$ |

Determine if statement (3) follows from statements (1) and (2) by the Law of Detachment or the Law of Syllogism. If it does, state which law was used. If it does not, write invalid.

7. (1) If you are a student, then you have lots of homework.
(2) If you have lots of homework, then you have no social life.
(3) If you are a student, then you have no social life.
8. (1) If the lines are perpendicular, then they intersect to form a right angle.
(2) Line l is perpendicular to line m .
(3) Lines l and m intersect to form a right angle.
9. (1) Vertical angles are congruent.
(2) $\angle A \cong \angle B$
(3) $\angle A$ and $\angle B$ are vertical angles.
10. (1) If the quadrilateral is a square, then it has four right angles.
(2) Quadrilateral $ABCD$ has four right angles.
(3) Quadrilateral $ABCD$ is a square.
11. (1) If you practice your clarinet, then you will improve.
(2) Kevin practices his clarinet.
(3) Kevin's clarinet playing improves.
12. (1) If $m\angle 2 \neq 40^\circ$, then $m\angle 3 \neq 140^\circ$.
(2) If $m\angle 3 \neq 140^\circ$, then $m\angle 4 \neq 40^\circ$.
(3) If $m\angle 2 \neq 40^\circ$, then $m\angle 4 \neq 40^\circ$.

In Exercises 13–17, assume the following statements are true.

- If I call the supervisor, then I must pay the rent. ($p \rightarrow q$)
 - If the apartment ceiling is not leaking, then it is not raining. ($\sim r \rightarrow \sim s$)
 - I will call the supervisor if the apartment ceiling leaks. ($p \rightarrow r$)
 - If it is not raining, then it is not Tuesday. ($\sim s \rightarrow \sim t$)
13. Write the contrapositive of the second statement.
 14. Write the contrapositive of the fourth statement.
 15. Write the premises in an order which makes a valid argument.
 16. It is Tuesday. Can you conclude that you must pay the rent? Explain.
 17. It is not Tuesday. Can you conclude you did not pay the rent? Explain.