Margin Exercise Answers

1. a. Statement **b.** Not a statement but an opinion **c.** Statement **2. a.** The Winter Olympics does not occur every 4 years **b.** SUV is not a model of vehicle **c.** The flight is late **3.** p: We do not have exams after each chapter; $\sim q$: Traveling is not educational; r: The game has started **4.** p: It is going to be hot today; q: There is no class today **5.** a: Today was rainy; b: Regan is graduating; c: It is New Year's Ever **6. a.** Quantified **b.** Quantified **c.** Not Quantified **d.** Quantified **7.** a: Some students make As in college algebra; b: No sea animals are mammals; c: Some birds are carnivorous, d: All classes are interesting.

8.4 Exercises

Concept Check:

Fill-in-the-Blank: Complete the sentences using information found in this section.

1. A _____ is a declaration that can be determined to be true or false, but not both.
2. A _____ is the logical opposite of a statement.
3. A _____ indicates the extent or scope of the term it refers to.
4. A statement containing one or more of the words all, none, some, or no is called a _____ _____.
5. The symbol ~ represents the _____ of a statement.
6. The negation of the quantifier some are is _____ _____.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

7. An opinion is not a valid statement.
8. All statements can be negated by adding the word "not".
9. "Not all trees are green" is the negation of the statement "All trees are green."
10. A statement can be both true and false at the same time.

Practice

Determine whether each of the following are statement or not. If it is not a statement, explain why it is not a statement. See Example 1.

1. I like horses.
2. $3 + 5 = 8$
3. Christmas is always on a Tuesday.
4. Game of Thrones is a very good show.

5. $5 + 3 = 1$

6. The Final Exam had 51 multiple choice questions.

Find the negations of the following statements. See Example 2.

7. A penny is a coin.

8. You got an A.

9. The course was easy.

10. $x + 2 = 5$.

11. There are 100 pennies in a dollar.

12. A week has seven days.

13. I do not like math.

14. A quarter is not a coin.

15. I will not receive any change.

16. You will not take a nap.

Find the negation for the following statements. See Examples 3 and 4.

17. p: You are not finished eating dinner.

18. p: Your stomach feels full.

19. p: You will not cook dinner.

20. p: You passed the course.

21. p: You thought the course was easy.

22. p: You studied a lot.

23. $\sim p$: The soup is not hot.

24. $\sim p$: The math test is tomorrow.

25. $\sim p$: Avocados are not green

26. $\sim p$: The sunflowers are not tall.

27. $\sim p$: The number is prime.

28. $\sim p$: Tomorrow is not payday.

Determine which of the following are quantified statements. If it is a quantified statement, identify the quantifier. See Example 6.

29. Some math courses are at capacity.

30. The teacher is sick today.

31. All prime numbers are odd.

32. None of the pants are khaki.

33. At least one butterfly has blue on it.

34. Twenty-five is a composite number.

Determine the negation of the given quantified statement. There may be more than one correct answer. See Example 7.

35. All even numbers are divisible by two.

36. Some of the tickets have been sold.

37. Some of the animals are not restless.

38. None of the audience members were paying attention.

39. Some of the art is for sale.

40. None of the desserts are chocolate.

41. All of the sodas are cold.

42. Some of the dentists do not recommend the toothpaste.

Writing & Thinking

43. Why is an opinion not considered a statement in logic?

44. Explain why the quantified statements "some p are not q" and "all p are q" are negations of each other.