EXERCISES

Practice and Problem Solving

A **Practice by Example**

Example 1
(page 68)

1. Identify the hypothesis and the conclusion in the cartoon.

FRANK AND ERNEST   By BOB THAVES

HERE'S AN INTERESTING ONE — IF YOU SEND IN THE PROOF-OF-PURCHASE LABEL, THEY SEND YOU A GET-WELL CARD.

Identify the hypothesis and conclusion of each conditional.

2. If you want to be fit, then get plenty of exercise.

Reading Math

Some conditionals may omit *then.* You can insert it mentally if you wish.

3. Algebra If $x + 20 = 32$, then $x = 12$.

4. "If you can see the magic in a fairy tale, you can face the future."
— Danielle Steel, novelist

5. "If somebody throws a brick at me, I can catch it and throw it back."
— Harry S Truman

6. "If you can accept defeat and open your pay envelope without feeling guilty, you're stealing." — George Allen, former NFL coach

7. "If my fans think that I can do everything I say I can do, then they're crazier than I am."— Muhammad Ali

8. ". . . if I could paint that flower in a huge scale, you could not ignore its beauty." — Georgia O'Keeffe, artist

Example 2
(page 68)

Write each sentence as a conditional.

9. Glass objects are fragile.

10. Algebra $3x - 7 = 14$ implies that $3x = 21$.

11. Whole numbers that have 2 as a factor are even.

12. All obtuse angles have measure greater than 90.

13. Good weather makes a picnic enjoyable.

14. Two skew lines do not lie in the same plane.

Write each statement as a conditional.

40. "We're half the people; we should be half the Congress."— Jeanette Rankin, former U.S. Congresswoman, calling for more women in office

41. "A great work is made out of a combination of obedience and liberty."
— Nadia Boulanger, orchestra conductor and musical mentor

42. "A problem well stated is a problem half solved."
— Charles F. Kettering, inventor

x^2 **Algebra** Write the converse of each statement. If the converse is true, write *true*; if not true, provide a counterexample.

43. If $x - 3 = 15$, then $x = 18$.

44. If y is negative, then $-y$ is positive.

45. If $x = -6$, then $|x| = 6$.

46. If $x < 0$, then $x^2 > 0$.

47. If $x = 2$, then $x^2 = 4$.

48. If $x < 0$, then $x^3 < 0$.

49. **Advertising** Al sees an ad that states, "You want to look good at the beach this summer. Join GoodFit Health Club." Al figures, "I am going to join GoodFit Health Club, so that I will look good at the beach."
a. Write the statement in the ad as a conditional.
b. Write Al's statement as a conditional.
c. **Writing** Explain why the statement in the ad does not have the same meaning as Al's statement.

Reading Math Let p represent the statement "A figure is a square."
Let q represent the statement "A figure has four congruent angles." Write the words for the symbolic statement shown. Determine the truth value of the statement. If it is false, provide a counterexample.

50. $p \rightarrow q$

51. $q \rightarrow p$

Advertising Advertisements often suggest conditional statements. For example, an ad might imply that if you buy a product, you will be popular.

52. What conditional is implied in the ad at the right?

53. **Open-Ended** Find an ad in which a conditional is used or implied.

Write each postulate as a conditional statement.

54. Two intersecting lines meet in exactly one point.

55. Two intersecting planes meet in exactly one line.

56. Two congruent figures have equal areas.

57. Through any two points there is exactly one line.

58. Through any three noncollinear points there is exactly one plane.

Example 3
(page 69)

Show that each conditional is false by finding a counterexample.

15. If it is not a weekday, then it is Saturday.

16. Odd integers less than 10 are prime.

17. If you live in a country that borders the United States, then you live in Canada.

18. If you play a sport with a ball and a bat, then you play baseball.

Example 4
(page 69)

Draw a Venn diagram to illustrate each statement.

19. If you live in New England, then you live in the United States.

20. If you play the flute, then you are a musician.

21. If an angle has measure 40, then it is acute.

22. Carrots are vegetables.

Example 5
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Write the converse of each conditional statement.

23. If you eat your vegetables, then you grow.

24. If a triangle is a right triangle, then it has a 90° angle.

25. If two segments are congruent, then they have the same length.

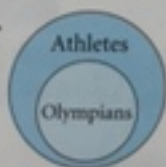26. If you do not work, you do not get paid.

Write the converse of each conditional statement. Determine the truth values of the original conditional and its converse.

27. If you travel from the United States to Kenya, then you have a passport.

28. **Coordinate Geometry** If a point is in the first quadrant, then its coordinates are positive.

29. **Chemistry** If a substance is water, then its chemical formula is H_2O.

30. **Probability** If the probability that an event will occur is 1, then the event is certain to occur.

31. If you are in Indiana, then you are in Indianapolis.

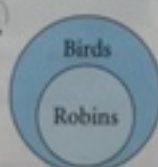32. If two angles have measure 90, then the angles are congruent.

Write a conditional statement that each Venn diagram illustrates.

33.
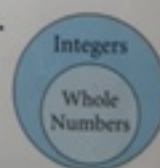Athletes
Olympians

34.
Birds
Robins

35.
Integers
Whole
Numbers

36. **Error Analysis** Ellen claims that both this conditional and its converse are true.
If x is an integer divisible by 3, then x^2 is an integer divisible by 3.
a. Write the converse of the conditional.
b. Only one of the statements is true. Determine which statement is false and provide a counterexample to support your answer.

Open-Ended Write a conditional statement and its converse (different from others in this lesson) as described below.

37. Both are true.   38. One is true; one is false.   39. Both are false.