

Homework
1.6 and 1.7

Identify the hypothesis and conclusion of each conditional.

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

Hypothesis: _____

Conclusion: _____

2. If $x + 20 = 32$, then $x = 12$.

Hypothesis: _____

Conclusion: _____

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

Hypothesis: _____

Conclusion: _____

Show that each conditional is false by finding a counterexample.

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

5. If integers are odd and less than 10, then the number is prime.

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

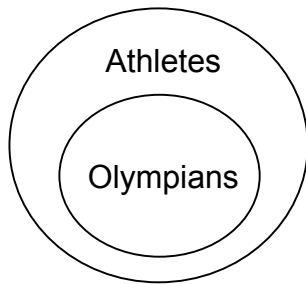
Draw a Venn diagram to illustrate each statement.

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

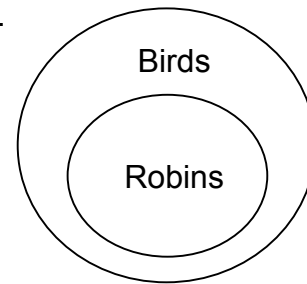
8. If an angle has a measure of 40° , then it is acute.

Write a conditional statement that each Venn diagram illustrates.

9.



10.



11. **Reason Abstractly:** If you can find an example for which both the hypothesis and the conclusion of a conditional statement are true, is the conditional statement itself necessarily true? Explain.

12. **Critique the Reasoning of Others:** Joanna says that $4 + 7 = 11$ is a counterexample that shows that the following conditional statement is false. Is Joanna correct? Explain.

If two integers are even, then their sum is even.

13. **Construct Viable Arguments:** Why do you only need a single counterexample to show that a conditional statement is false?

Each conditional statement below is true. Write its converse. If the converse is also true, combine the statements as a biconditional.

14. If two lines are parallel, then they are coplanar.

15. If a number is divisible by 20, then it is even.

16. If you live in Washington, D. C., then you live in the capital of the United States.

Write (a) the converse, (b) the inverse, and (c) the contrapositive of each conditional statement.

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

Converse: _____

Inverse: _____

Contrapositive: _____

18. If you do not do your homework, then you will fail geometry.

Converse: _____

Inverse: _____

Contrapositive: _____

19. If today is Friday, then tomorrow is Saturday.

Converse: _____

Inverse: _____

Contrapositive: _____

Write (a) the converse, (b) the inverse, and (c) the contrapositive of each conditional statement. Determine the truth value of each.

20. If $x = 3$, then $x^2 = 9$.

Converse: _____ T or F

Inverse: _____ T or F

Contrapositive: _____ T or F

21. If two angles are supplementary, then their sum is 180° .

Converse: _____ T or F

Inverse: _____ T or F

Contrapositive: _____ T or F

22. If two lines are perpendicular, then they form right angles.

Converse: _____ T or F

Inverse: _____ T or F

Contrapositive: _____ T or F

23. **Make Use of Structure:** Are these two statements logically equivalent? Explain.

If a polygon is a square, then it is a quadrilateral.

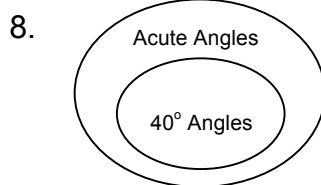
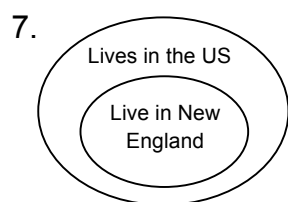
If a polygon is a quadrilateral, then it is a square.

24. **Critique the Reasoning of Others:** Toby says that the converse of the following statement is true. Is Toby's reasoning correct? Explain.

If a number is divisible by 6, then it is divisible by 2.

Answer Key

1. Hypothesis: You want to be fit. Conclusion: Get plenty of exercise.
2. Hypothesis: $x + 20 = 32$ Conclusion: $x = 12$
3. Hypothesis: A triangle is a right triangle. Conclusion: It has a 90° angle.
4. Sunday
5. Answers will vary. Example: 9
6. Mexico



9. If a person is an Olympian, then that person is an athlete.
10. If something is a robin, then it is a bird.
11. No; Answers will vary.
12. No; Answers will vary.
13. Answers will vary.
14. If two lines are coplanar, then they are parallel. It is false since two coplanar lines could intersect.
15. If a number is even, then it is divisible by 20. It is false since 4 is even and not divisible by 20.
16. If you live in the capital of the U.S., then you live in Washington, D. C.
Biconditional: You live in Washington, D.C. if and only if you live in the capital of the U.S.
17. Converse: If two segments have the same length, then they are congruent.
Inverse: If two segments are not congruent, then they do not have the same length.
Contrapositive: If two segments do not have the same length, then they are not congruent.
18. Converse: If you fail geometry, then you did not do your homework.
Inverse: If you do your homework, then you will pass geometry.
Contrapositive: If you pass geometry, then you did your homework.
19. Converse: If tomorrow is Saturday, then today is Friday.
Inverse: If today is not Friday, then tomorrow is not Saturday.
Contrapositive: If tomorrow is not Saturday, then today is not Friday.
20. Converse: If $x^2 = 9$, then $x = 3$. False
Inverse: If $x \neq 3$, then $x^2 \neq 9$. False
Contrapositive: If $x^2 \neq 9$, then $x \neq 3$. True
21. Converse: If two angles add up to 180° , then they are supplementary. True
Inverse: If two angles are not supplementary, then their sum is not 180° . True
Contrapositive: If two angles do not have a sum of 180° , then they are not supplementary. True
22. Converse: If two lines form right angles, then they are perpendicular. True
Inverse: If two lines are not perpendicular, then they do not form right angles. True
Contrapositive: If two lines do not form right angles, then the lines are not perpendicular. True
23. No. Answers will vary.
24. No. Answers will vary.