

State the hypothesis and the conclusion of each conditional.

1. If she's smart, then I'm a genius.
2. $2x - 1 = 5$ only if $x = 3$.
3. $8y = 40$ implies $y = 5$.
4. $\angle 1 \cong \angle 2$ if $m\angle 1 = m\angle 2$

State the converse of each conditional. Is the converse true or false?

5. If today is Friday, then tomorrow is Saturday.
6. If a number is divisible by 6, then it is divisible by 3.
7. If $6x = 18$, then $x = 3$.

Provide a counterexample to show that each statement is false. You may use words or draw diagrams.

8. If $n^2 = 5n$, then $n = 5$.
9. If point G is on ray \overrightarrow{AB} , then G is on ray \overrightarrow{BA}
10. If a four-sided figure has four right angles, then it has four congruent sides.

Rewrite the pair of conditionals as a biconditional.

11. If B is between A and C, then $AB + BC = AC$
If $AB + BC = AC$, then B is between A and C

Write the biconditional as two conditionals that are converses of each other.

12. Points are collinear if and only if they all lie in one line.

Tell whether each statement is true or false. Then write the converse and tell whether it is true or false.

13. If $x = -6$, then $|x| = 6$
14. If $m\angle T = 40$, then $\angle T$ is not obtuse.

For each statement in Exercises 15 and 16, copy and complete a table like the one shown below.

	If <u> ?</u> , then <u> ?</u> .	True/False
Statement	?	?
Contrapositive	?	?
Converse	?	?
Inverse	?	?

15. If I live in Los Angeles, then I live in California
16. If $x^2 = 49$, then $x = 7$.

Reword the given statement in if-then form and illustrate it with a Venn diagram. What can you conclude by using the given statement together with each additional statement? If no conclusion is possible, say so.

17. Given All senators are at least 30 years old
 - a. Jose Avila is 48 years old
 - b. Rebecca Castelloe is a senator
 - c. Constance Brown is not a senator
 - d. Ling Chen is 29 years old
18. Given: Math teachers assign hours of homework
 - a. Bridget Sullivan is a math teacher
 - b. August Campos assigns hours of homework
 - c. Andrew Byrnes assigns no homework.
 - d. Jason Babler is not a math teacher.

Underline the hypothesis and circle the conclusion.

3. If a polygon is a pentagon, then it has five sides.
4. If two lines form vertical angles, then they intersect.
5. If you run, then you are fast.

Rewrite into If-then form.

7. $9x + 5 = 23$, because $x = 2$.
8. Today is Friday, and tomorrow is the weekend.
9. You are in a band, and you play the drums.
10. Two right angles are supplementary angles.

Exercises 13–16, write the negation of the statement. (See Example 2.)

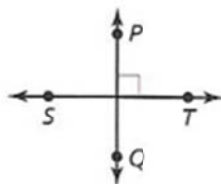
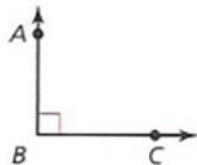
13. The sky is blue. 14. The lake is cold.
15. The ball is *not* pink. 16. The dog is *not* a Lab.

Exercises 17–24, write the conditional statement $p \rightarrow q$, the converse $q \rightarrow p$, the inverse $\sim p \rightarrow \sim q$, and the contrapositive $\sim q \rightarrow \sim p$ in words. Then decide whether each statement is true or false. (See Example 3.)

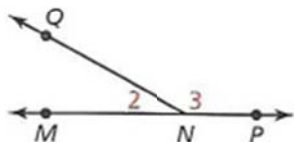
7. Let p be “two angles are supplementary” and let q be “the measures of the angles sum to 180° .”
19. Let p be “you do your math homework” and let q be “you will do well on the test.”
20. Let p be “you are not an only child” and let q be “you have a sibling.”

In Exercises 25–28, decide whether the statement about the diagram is true. Explain your answer using the definitions you have learned. (See Example 4.)

25. $m\angle ABC = 90^\circ$
26. $\overrightarrow{PQ} \perp \overrightarrow{ST}$



27. $m\angle 2 + m\angle 3 = 180^\circ$
28. M is the midpoint of \overline{AB} .



29) $2x - 3y = 17$

$3x + 2y = 6$

30) $9x - 3y = 30$

$2x + 2y = 36$

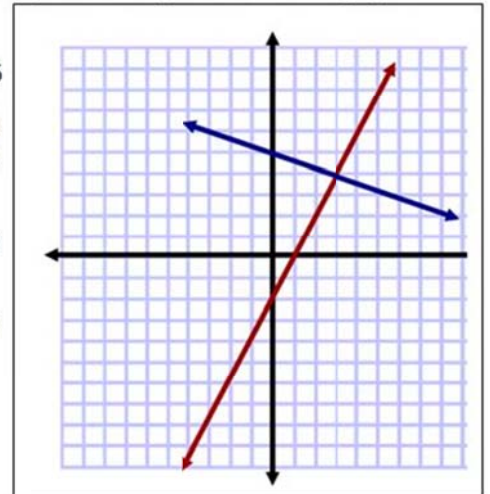
31) $12x - 9y = -27$

$8x + 21y = 45$

32)

Which system of equations is represented on the graph?

- A. $y = 2x - 2$
 $y = -1/3x + 5$
- B. $y = 1/2x - 2$
 $y = 1/3x + 5$
- C. $y = 2x - 2$
 $y = 1/3x + 5$
- D. $y = -2x - 2$
 $y = -1/3x + 5$



33)

What is the greatest common factor of: $12a^4b^2 - 3a^2b^5$?

- A. $12a^2b^2$
- B. $3a^4b^5$
- C. $3a^2b^2$
- D. $12a^4b^5$

34)

Simplify: $(3x^4 + 3x^2 - x + 5) - 3(x^4 + x^3 - 2x^2 - 6)$

- A. $6x^4 + 3x^3 + 5x^2 - x - 13$
- B. $3x^3 + 3x^2 - x - 13$
- C. $3x^4 - 3x^3 + 9x^2 - x + 23$
- D. $-3x^3 + 9x^2 - x + 23$

35)

Simplify: $\frac{x^2 - x - 6}{x^2 - 2x - 8}$

- A. $\frac{x+3}{x+4}$
- B. $\frac{-x-6}{-2x-8}$
- C. $\frac{x-3}{x-4}$
- D. $\frac{x+2}{x-4}$