

Use the Law of Detachment to draw a conclusion.

1. If a student gets an A on a final exam, then the student will pass the course.
Felicia gets an A on the music theory final exam.
2. If a student wants to go to college, then the student must study hard.
Rashid wants to go to the University of North Carolina.

3. If two lines are parallel, then they do not intersect.
Line l is parallel to line m .
4. If there is lightning, then it is not safe to be out in the open.
Marla sees lightning from the soccer field.

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83) If possible, use the Law of Detachment to draw a conclusion. If not possible, write not possible.

5. If a figure is a rectangle, then it has two pairs of parallel sides.
Figure $ABCD$ is a rectangle.
- x** 6. **Algebra** If n is a prime number greater than 2, then n^2 is an odd number.
 9^2 is an odd number.
7. If three points are on the same line, then they are collinear.
Points X , Y , and Z are on line m .
8. If an angle is obtuse, then it is not acute.
 $\angle XYZ$ is not obtuse.
9. If you are a Golden Gopher, you've attended the University of Minnesota.
(See photo.)

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9) Use the Law of Syllogism to draw a conclusion.

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84) 10. **Zoology** If an animal is a red wolf, then its scientific name is *Canis rufus*.
If an animal is named *Canis rufus*, then it is endangered.
11. If two planes intersect, then they intersect in a line.
If two planes are not parallel, then they intersect.
12. If you read a good book, then you enjoy yourself.
If you enjoy yourself, then your time is well spent.
13. If you are studying biology, then you are studying a science.
If you are studying botany, then you are studying biology.

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9) **Geography** Use the Law of Detachment and the Law of Syllogism to draw conclusions from the following statements.

14. If a mountain is the highest in Alaska, then it is the highest in the United States.
If an Alaskan mountain is over 20,300 ft high, then it is the highest in Alaska.
Alaska's Mount McKinley is 20,320 ft high.
15. If you live in Little Rock, then you live in Arkansas.
Levon lives in Little Rock.
If you live in Arkansas, then you live in the 25th state to enter the Union.

For Exercises 16–21, assume that the following statements are true.

- A. If Maria drinks juice, then it is breakfast time.
B. If it is lunchtime, then Kira drinks milk and nothing else.
C. If it is mealtime, then Curtis drinks water and nothing else.
D. If it is breakfast time, then Julio drinks juice and nothing else.
E. Maria drinks juice.

Use only the information given above. For each statement, write *must be true*, *may be true*, or *is not true*. Explain your reasoning.

16. Julio drinks juice. 17. Curtis drinks water. 18. Kira drinks milk.
19. Curtis drinks juice. 20. Maria drinks water. 21. Julio drinks milk.

For each of the following, write the first statement as a conditional. If possible, use the Law of Detachment to make a conclusion. If not possible, write *not possible*.

22. All national parks are interesting.
Mammoth Cave is a national park.
23. **Weather** The temperature is always above 32°F in Key West, Florida.
The temperature is 62°F .
24. Every high school student likes music.
Ling likes music.
25. All squares are rectangles.
 $ABCD$ is a square.
26. **Writing** Give an example of a rule used in your school that could be written as a conditional. Explain how the Law of Detachment is used in applying that rule.

For Exercises 27–31, use the cartoon and deductive reasoning to answer *yes* or *no*. If *no*, explain.

27. Is a person with a red car allowed to park here on Tuesday at 10:00 A.M.?
28. Is a man with a beard allowed to park here on Monday at 10:30 A.M.?
29. Is a woman with a wig allowed to park here on Saturday at 10:00 A.M.?
30. Is a person with a blue car allowed to park here on Tuesday at 9:05 A.M.?
31. Is a person with a convertible with leather seats allowed to park here on Sunday at 6:00 P.M.?



32. **Reasoning** Assume that the following statements are true.
If Anita goes to the concert, Beth will go.
If Beth goes to the concert, Aisha will go.
If Aisha goes to the concert, Ramon will go.
Only two of the four students went to the concert. Who were they?
33. **Critical Thinking** Consider the following given statements and conclusion.

Given: If an animal is a fish, then it has gills.
A turtle does not have gills.

You conclude: A turtle is not a fish.

This argument does not use the Law of Syllogism or the Law of Detachment, but it does use good deductive reasoning.

- a. Draw a Venn diagram to illustrate the given information.
- b. Use the Venn diagram to help explain why the argument uses good reasoning.

