

**LESSON
2.3****Practice A***For use with pages 88–95***Use the Law of Detachment to make a valid conclusion in the situation.**

1. If you get a hit, then your baseball team will win. You hit a home run.
2. If Rylee gets promoted, then Callie will also be promoted. Rylee is promoted.
3. Any time Kendra runs in a cross country race, if she runs a strong race, then she wins. In the cross country race last Saturday, Kendra ran her best race.
4. If two integers are added together, then the result is an integer. You add an integer x to another integer y .
5. If you double a negative number, then the result is a smaller number. You calculate $2x$, where $x < 0$.
6. If an integer is divided by one of its factors, then the result is another one of the integer's factors. You divide an even integer x by 2.

Use the Law of Syllogism to write the statement that follows from the pair of statements that are given.

7. If Moose is hungry when he goes to the pizza shop, then he'll finish a whole pizza. If Moose eats a whole pizza, then he goes through a pitcher of soda.
8. If you mail the payment by noon, then it will arrive by tomorrow. If your payment arrives by tomorrow, then you won't be charged a late fee.
9. If Estelle takes her broker's advice, she'll invest in stock X. If Estelle invests in stock X, she'll earn 50% on her investment by next year.
10. If a triangle has two angles of 60° , then the triangle is equiangular. If a triangle is equiangular, then it is also equilateral.

Decide whether the conclusion reached from the two statements demonstrates the *Law of Detachment*, the *Law of Syllogism*, or *neither*.

11. If Cedric plays in a big game, then he gets nervous. If Cedric gets nervous, then he performs well.
Conclusion: If Cedric plays in a big game, then he performs well.
12. If Leanne spends more than \$30 on her car, then she'll have to wait until next week to buy Michael's birthday gift. Leanne spent \$40 on her car.
Conclusion: Leanne will have to wait until next week to buy Michael's birthday gift.
13. If Lavonne gets money, she gives half of it to Sid. If Sid gets money, he gives half of it to Lavonne.
Conclusion: Lavonne and Sid share their money equally.

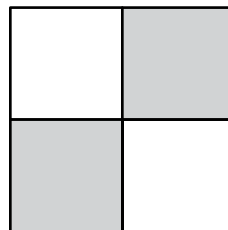
LESSON
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Practice A *continued*
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Decide whether *inductive* or *deductive* reasoning is used to reach the conclusion. Explain your reasoning.

14. While shopping for a product, you notice that brand A is more expensive than brand B. You conclude that brand A is of higher quality than brand B.
15. Because the brand A product costs \$1.50 and the brand B product costs \$1.00, you conclude that the brand A product is 50% more expensive.
16. It normally takes you 20 minutes to walk home from school. By walking faster one day, you make it in 15 minutes. The following day, you make it in 12 minutes. You conclude that you could make the trip in as little as 10 minutes.
17. On the first meet of the year, JD, Bob, and Raul finish their race in a tie. In the final meet of the year, Raul finishes well ahead of Bob and JD. Having seen both races, you conclude that Raul trained the hardest.

In Exercises 18 and 19, use the figure at the right.

18. Based on what you see in the figure, use inductive reasoning to make a conjecture about how the area of one square compares to the area of another square with sides that are twice as long.
19. Use deductive reasoning to prove your conjecture by using side lengths of $s = x$ and $s = 2x$ in the formula for the area of a square and comparing the result.



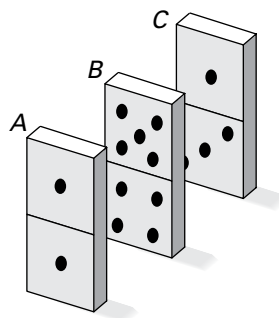
Use the figure showing three standing dominos, A, B, and C.

20. Is the *Law of Detachment* or the *Law of Syllogism* used to reach the conclusion below?

Statements: If A is pushed into B, then B will be knocked into C. A is pushed into B.

Conclusion: B is knocked toward C.

21. Write a set of statements and a conclusion that demonstrate the Law of Syllogism.
22. Suppose domino D is placed behind domino C. Write a set of statements and a conclusion that demonstrate the Law of Syllogism being used to connect more than two conditional statements.



Lesson 2.2, continued

angles if and only if the sum of their measures is 90° . **6.** A polygon is equilateral if and only if all of its sides are congruent.

Challenge Practice

1. If-then form: If angles are adjacent, then they share a common side; converse: If angles share a common side, then they are adjacent; false; counterexample: If point C is in the interior of $\angle ABD$, then $\angle ABD$ and $\angle CBD$ share a common side, but are not adjacent.

2. If-then form: If two circles have the same diameter, then they have the same circumference; converse: If two circles have the same circumference, then they have the same diameter; true; biconditional statement: Two circles have the same circumference if and only if they have the same diameter. **3.** If-then form: If an animal is a leopard, then it has spots; converse: If an animal has spots, then it is a leopard; false; counterexample: A giraffe is an animal and it has spots, but it is not a leopard. **4.** If-then form: If a leopard has pale gray fur, then it is a snow leopard; converse: If a leopard is a snow leopard, then it has pale gray fur; true; biconditional statement: A leopard is a snow leopard if and only if it has pale gray fur. **5.** Some students do not study. **6.** No students are involved in extracurricular activities. **7.** Some children are allowed at the concert. **8.** None of the \$20 bills are counterfeit. **9. a.** no **b.** yes

10. a. no **b.** no

Lesson 2.3

Practice Level A

1. Your team wins the baseball game. **2.** Callie is also promoted. **3.** Kendra won the race.

4. The sum is an integer. **5.** $2x < x$

6. The quotient is a factor of x . **7.** If Moose is hungry when he goes to the pizza shop, then he drinks a pitcher of soda.

8. If you mail the payment by noon, then you won't be charged a late fee. **9.** If Estelle takes her broker's advice, then she'll earn 50% on her investment by next year. **10.** If a triangle has two angles of 60° , then it is equilateral. **11.** Law of Syllogism **12.** Law of Detachment **13.** neither **14.** inductive; the conclusion is a conjecture based on your perception from a specific example.

15. deductive; the conclusion is based on a computation of the actual percent using the given values. **16.** inductive; the conclusion is a conjecture based on your intuition.

17. inductive; the conclusion is a conjecture drawn on your race observations rather than on the actual training effort. **18.** The area of one square is one-fourth of the area of another square with sides that are twice as long.

19. $A_1 = s^2 = x^2$, $A_2 = (2x)^2 = 4x^2$; $A_1 = \frac{1}{4} A_2$

20. Law of Detachment **21.** *Sample answer:* If A is pushed into B, then B will be knocked into C. If B is knocked into C, then C will fall down. Conclusion: If A is knocked into B, then C will fall down. **22.** *Sample answer:* If A is pushed into B, then B will be knocked into C. If B is knocked into C, then C will knock into D. If C knocks into D, then D will fall down. Conclusion: If A is pushed into B, then D will fall down.

Practice Level B

1. Law of Detachment **2.** invalid **3.** Law of Detachment **4.** Law of Syllogism **5.** invalid

6. Law of Syllogism **7.** deductive reasoning; Deductive reasoning is based on logic and order. If Walt is taller than Peter and Peter is taller than Natalie, then Walt is taller than Natalie.

8. inductive reasoning; Inductive reasoning depends on previous examples and patterns to form a conjecture. If Brand Y costs more than Brand X and Brand X costs more than any other brand, then Brand Y costs more than all other brands. **9.** inductive reasoning; Inductive reasoning depends on previous examples and patterns to form a conjecture. Dana came to her conclusion based on previous examples.

10. deductive reasoning; Deductive reasoning is based on logic and order. If Anthony is a 16–18 year old with a license in Nevada, then Anthony must have taken the required driver education.

11. not valid; It does not say that Jeff is not allowed to play video games on Saturday afternoon. It says that he does not play video games on Saturday afternoon. **12.** not valid; Katie knows that all sophomores take driver education. It does not say that only sophomores take driver education. You do not know if Brandon is a sophomore. **13.** false; The mall is open. Therefore Jodi and Dan went shopping, and therefore Dan bought a pretzel. You cannot conclude that Dan also bought a pizza.