



1. Show that the conjecture is false by finding a counterexample.

If $a > b$, then $\frac{a}{b} > 0$

$$\begin{array}{l} a = 10 \\ b = -5 \end{array}$$

$$\begin{array}{l} 10 > -5 \quad \checkmark \\ \frac{10}{-5} > 0 \quad ? \\ -2 > 0 \quad \times \end{array}$$

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2. Write the converse of the statement,
"If a dog is a bloodhound, then it has floppy ears."

If a dog has floppy ears, then it is a bloodhound.

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3. Write the contrapositive of the statement,
"If a state's capital is Denver, then the state is Colorado."

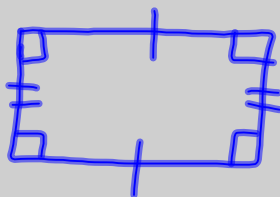
If the state is not Colorado, then its capital is not Denver

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4. Determine if the biconditional is true. If false, give a counterexample.
A figure is a square if and only if it is a rectangle.

Biconditional: False



All rectangles are not squares b/c they do not have 4 \cong sides.

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5. What is a counterexample to the following?

If $x^2 = 25$, then $x = 5$

$$x = -5$$

$$(-5)^2 = 25 \checkmark$$
$$-5 \stackrel{?}{=} 5 \times$$

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6. Determine the hypothesis of the statement: If p , then q .

P

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7. Given a conditional statement of the form “If x , then y ”, what form is its contrapositive?

If not y , then not x .

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8. Determine if the conjecture is valid by the Law of Syllogism.

Given: If you are in California, then you are on the west coast. If you are in Los Angeles, then you are in California. H

Conjecture: If you are in Los Angeles, then you are on the west coast. H

Law of Syllogism

~~If a , then b .~~

~~If b , then c .~~

If a , then c .

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9. Determine if the conjecture is valid by the Law of Detachment.

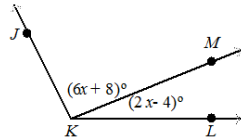
Given: If Tommy made enchiladas tonight, then Tommy must have an oven. Tommy has an oven.

Conjecture: Tommy made enchiladas tonight.

False

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10. Given this diagram and that $m\angle JKL = 100^\circ$, Stephanie solved for the value of x . Fill in the missing justifications



Statements	Reasons
1. $m\angle JKL = 100$	1. Given
2. $\angle JKM = 6x + 8$	2. Given
3. $\angle MKL = 2x - 4$	3. Given
4. $\angle JKM + \angle MKL = \angle JKL$	4. Angle Addition Post.
5. $6x + 8 + 2x - 4 = 100$	5. Substitution
6. $8x + 4 = 100$	6. Combine Like Terms
7. $x = 96$	7. Subtraction POE
8. $x = 12$	8. Division POE

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11. Mrs. Tibbs has 26 feet of fencing to build a rectangular play area for her rabbit. She wants to have the largest play area possible, but it can be no more than 8 feet long. To find the width of the play area, she uses the formula $P = 2l + 2w$, where P is the perimeter, l is the length, and w is the width of the rectangle. Fill in the missing justifications.

<u>Statements</u>	<u>Reasons</u>
1. $P = 26$ $w = 8$	1. Given
2. $P = 2L + 2w$	2. Def. of perimeter
3. $26 = 2L + 2(8)$	3. Substitution
4. $26 = 2L + 16$	4. Combine like terms
5. $2L = 10$	5. Subtraction POE
6. $L = 5$	6. Division POE

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12. Solve the equation $4x - 6 = 34$. Fill in the missing justifications.

<u>Statements</u>	<u>Reasons</u>
1. $4x - 6 = 34$	1. Given
2. $4x = 40$	2. Addition POE
3. $x = 10$	3. Division POE

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13. Use the Law of Syllogism to draw a conclusion from the given information.

Given: ~~If two lines are perpendicular, then they form right angles.~~ ~~If two lines meet at a 90° angle, then they are perpendicular.~~ ~~Two lines meet at a 90° angle.~~

The lines form right angles.

~~$a \rightarrow b$~~
 ~~$b \rightarrow c$~~
 $a \rightarrow c$

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14. Find a counterexample to the conjecture below.

If an animal has no legs, then it is a snake.

Dolphin

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15. Identify the hypothesis and conclusion of the statement below. Then, write the negation of each.

If you break it, then you will have to buy it.

hypothesis: *If you break it*
conclusion: *then you will have to buy it*
Negation of hypothesis: *If you do not break it*
Negation of conclusion: *then you will not have to buy it*

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16. Use detachment or syllogism to draw a valid conclusion to the following statement. Identify which law was used in reaching the conclusion.

If the length of a rectangle is increased, then the perimeter will increase.

The length of the rectangle is increased by 5.

Therefore the perimeter will increase
Law of detachment

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17. For the following statements, use the Law of Detachment to write a valid concluding statement.
 If a number is a perfect square, it is not prime.
 49 is a perfect square.

Therefore it is not
 Prime

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18. Solve the equation $3(x + 2) = x + 2$. Provide a justification for each step.

Statement	Reason
1. $3(x + 2) = x + 2$	1. Given
2. $3x + 6 = x + 2$	2. Distribute
$\quad \underline{-x} \quad \quad \quad \underline{-x}$	3. Subtraction
3. $2x + 6 = 2$	4. Subtraction
$\quad \quad \quad \underline{-6} \quad \quad \quad \underline{-6}$	5. division
4. $2x = -4$	
5.) $\frac{2x}{2} = \frac{-4}{2}$	

MaileyAnn

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19. The area of a rectangular photograph is 84 square inches. The photograph's length is $(2x + 2)$ inches, and the photograph's width is 7 inches. Find the dimensions of the photograph. Provide a justification for each step.

Statement	Reason
1. $A = 84$	1. Given
2. $L = 2x + 2$	2. Given
3. $W = 7$	3. Given
4. $A = LW$	4. Def of area of a rectangle
5. $84 = (2x + 2)7$	5. Substitution
6. $84 = 14x + 14$	6. Distribute
7. $70 = 14x$	7. Subtraction POE

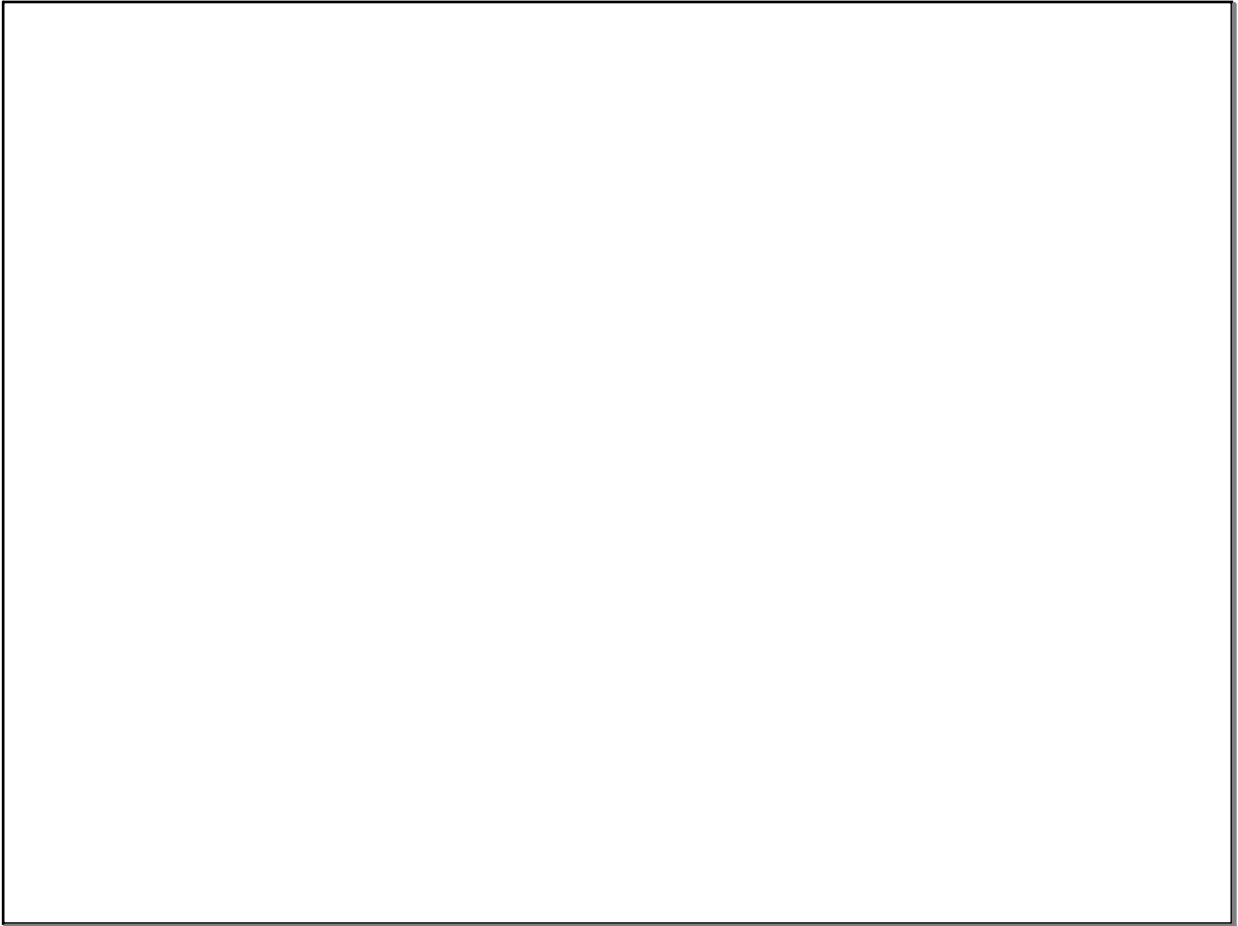
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20. For the statement set below, draw a valid conclusion. Identify which law is used to reach the conclusion.

If Betty takes a vacation, she goes to the beach. If Betty goes to the beach, she goes swimming.

Law of Syllogism
 conclusion: If Betty takes a vacation, then she goes swimming.

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