**Math 231 -- Practice Quiz 2 Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*Fill in each of the truth tables, then explain the operation in your own words.*

Explain:

|  |  |  |
| --- | --- | --- |
|  |  |  |
| T | T |  |
| T | F |  |
| F | T |  |
| F | F |  |

Explain:

|  |  |  |
| --- | --- | --- |
|  |  |  |
| T | T |  |
| T | F |  |
| F | T |  |
| F | F |  |

Explain:

|  |  |  |
| --- | --- | --- |
|  |  |  |
| T | T |  |
| T | F |  |
| F | T |  |
| F | F |  |

Explain:

|  |  |  |
| --- | --- | --- |
|  |  |  |
| T | T |  |
| T | F |  |
| F | T |  |
| F | F |  |

*Fill in the other three boxes in the table:*

|  |  |
| --- | --- |
| Conditional: | Converse: |
| Contrapositive: | Inverse: |

*Match the names of the different kinds of proofs to the given descriptions:*

|  |  |
| --- | --- |
| Proof of Existence \_\_\_\_\_ | **A** Clearly and carefully state that the assumption is true.  Step-by-step, using algebra, arithmetic, or other reasoning, show that the conclusion is true. |
| Proof by Exhaustion \_\_\_\_\_ | **B** There are two or more places to start which lead to the same conclusion. Start with the first assumption, prove the conclusion. Start over with the second assumption, prove the conclusion. Repeat as necessary. |
| Direct Proof \_\_\_\_\_ | **C** You only need to find one example that works. |
| Proof by Division into Cases \_\_\_\_\_ | **D** To prove that P implies Q, it is enough to start with not-Q, and then prove not-P. |
| Proof by Contraposition \_\_\_\_\_ | **E** To prove that P is true, first assume that it is false. Then, using the assumption that P is false, show a contradiction. Therefore P is true. |
| Proof by Contradiction \_\_\_\_\_ | **F** Go through the specified list of things one by one, and show that the statement is true for each of them. |

Rewrite the statement without using the symbols  or ∃, and without using any variables:

 a, b 

*Here is a conditional statement that happens to be true:*

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

Write the converse. Is it true or false?

Write the inverse. Is it true or false?

Write the contrapositive. Is it true or false?

Fill in the truth table for this statement:



|  |  |  |
| --- | --- | --- |
|  |  |  |
| T | T |  |
| T | F |  |
| F | T |  |
| F | F |  |

*State whether each argument is valid or invalid. Use a diagram or symbols to explain.*

All cats have four legs.

I have four legs.

 I am a cat.

All cats have four legs.

I do not have four legs.

 I am a not a cat.