Assignment 1

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$$p \to \neg p \tag{1}$$
$$(p \leftrightarrow q) \oplus (q \to \neg p) \tag{2}$$

Solution:

1.

p	$\neg p$	$p \to \neg p$
T	F	F
F	T	T

2.

q	p	$\neg p$	$p \leftrightarrow q$	$q \to \neg p$	$(p \leftrightarrow q) \oplus (q \to \neg p)$
T	T	F	T	F	T
T	F	T	F	T	T
F	T	F	F	T	T
F	F	T	T	T	F

1. Willy gets caught whenever he cheats.
2. A positive integer is a prime only if it has no divisors other than 1 and itself
3. To be a citizen of this country, it is sufficient that you were born in the United States.
4. Getting elected follows from knowing the right people.
5. For you to get an A in this course, it is necessary that you learn how to solve discrete mathematics problems.
6. Abena will go to Accra unless she misses the bus.

Solution:

1. If Willy cheats, then he will get caught.

2. If a positive number is a prime, then it has no divisors other than 1 and itself.

3. If you were born in the United States, then you can be a citizen of this country

4. If you know the right people, then you can get elected.

5. If you are to get an A in this course, then you must learn to solve discrete mathematics problems.

6. If Abena does not miss the bus, then she will go to Accra.

1. If 1 + 1 = 3, then unicorns exist.
2. If 1 + 1 = 2, then dogs can fly.
3. 0 > 1 if and only if 2 > 1.
4. 1 + 1 = 3 if and only if 2 < 1.

Solution:

1. True. This is because the premise is false rendering the whole statement true.

2. False. This is because the premise is true but the conclusion is false rendering the whole statement false.

3. False. This is because this is a biconditional statement which requires both propositions to have the same truth value, but here the first proposition is false but the second is true.

4. True. This is because this is a biconditional statement which requires both propositions to have the same truth value, and here both propositions have the same truth value of False.