

6.4 More on Conditionals -----

For the given direct statement, write the indicated related statement (converse, inverse, or contrapositive).

1) All cats catch birds. (inverse)

2) $q \rightarrow \sim p$ (inverse)

3) Love is blind. (contrapositive)

4) He who laughs last, laughs loudest. (inverse)

Write the statement in the form "if p, then q."

5) Practice is necessary for making the team.

6) An even number is divisible by two.

Construct a truth table for the statement.

$$7) (p \leftrightarrow \sim q) \leftrightarrow (\sim p \vee q)$$

Write the converse, inverse, or contrapositive as requested, and determine whether it is equivalent to the original statement.

8) If you have 30 years of teaching experience, then you get your full retirement. (Contrapositive)

6.5 Arguments -----

Decide whether the argument is valid or invalid, and give the form (of valid or invalid argument) that applies.

9) If I'm hungry, then I will eat.

I'm not hungry.

I will not eat.

10) You get soup or you get salad.

You did not get soup.

You got salad.

Determine whether the argument is valid or invalid. Use a truth table.

$$11) (p \rightarrow q) \wedge (q \rightarrow r)$$

p

r

12) Loretta's hobby is stamp collecting. If her husband likes to fish, then Loretta's hobby is not stamp collecting. If her husband does not like to fish, then Nathan likes to read. Therefore, Nathan likes to read.

13) The Rams will be in the playoffs if and only if Ozzie is an all-star. Mark loves the Rams or Ozzie is an all-star. Mark does not love the Rams. Therefore, the Rams will not be in the playoffs.

Use the premises to give a conclusion that yields a valid argument.

14) All fish can dream. Any dead animal is unable to dream. All live animals have a heartbeat.

15) People who smile are happy. Alert people are not happy. Careful drivers are alert. Drivers who are not careful have accidents.

Answer Key

Testname: MATH230_LIAL_HW6B

- 1) If it's not a cat, then it doesn't catch birds.
- 2) $\sim q \rightarrow p$
- 3) If it is not blind, then it is not love.
- 4) If he doesn't laugh last, he doesn't laugh loudest.
- 5) If you make the team, then you practice.
- 6) If a number is even, then it is divisible by two.
- 7)

p	q	$(p \leftrightarrow \sim q) \leftrightarrow (\sim p \vee q)$				
T	T	F	F	F	F	T
T	F	T	T	F	F	F
F	T	T	F	T	T	T
F	F	F	T	F	T	T
		(2)	(1)	(5)	(3)	(4)

- 8) If you do not get your full retirement, then you do not have 30 years of teaching experience.
Equivalent
- 9) Invalid; fallacy of the inverse
- 10) Valid; disjunctive syllogism
- 11) Valid
- 12) Valid
- 13) Invalid
- 14) All fish have a heartbeat.
- 15) People who smile have accidents.