

# Discrete Math: Homework 1

Tuesday/Thursday 11:00-12:15, Phillips 383

*Reese Lance - Section 003*

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**Unit 1.1****#2**

- a) Not declarative, a command.
- b) Not declarative, a question.
- c) Is a proposition, not true: there are black flies in Maine.
- d) Not declarative, truth value can change based on  $x$ .
- e) Is a proposition, not true; the moon is not made of cheese.
- f) Not declarative, truth value can change based on  $n$ .

**#4**

- a) Janice does not have more Facebook friends than Juan.
- b) Quincy is not smarter than Venkat.
- c) Zelda does not drive more miles to school than Paola.
- d) Briana does not sleep longer than Gloria.

**#10**

Let  $p$  and  $q$  be the propositions:

$p$ : I bought a lottery ticket this week.

$q$ : I won the million dollar jackpot.

Express each of these propositions as an English sentence.

- a) I did not buy a lottery ticket this week.
- b) I bought a lottery ticket this week or I won the million dollar jackpot.
- c) If I bought a lottery ticket this week, then I won the million dollar jackpot.
- d) I bought a lottery ticket this week and I won the million dollar jackpot.
- e) I bought a lottery ticket this week if and only if I won the million dollar jackpot.
- f) If I did not buy a lottery ticket this week, then I didn't win the million dollar jackpot.
- g) I did not buy a lottery ticket this week and I did not win the million dollar jackpot.
- h) I did not buy a lottery ticket this week, or I did buy a lottery ticket this week and won the million dollar jackpot.

**#18**

- a) Both equations are true, therefore True.
- b) One equation is false and one is true, therefore False.
- c) Both propositions are false, therefore True.
- d) One equation is false and one is true, therefore False.

**#20**

- a) Both conditions are false, therefore the statement is true.
- b) Both conditions are false, therefore the statement is true.
- c) Since  $p$  is true and  $q$  is false, the statement is false.
- d) Both conditions are true, therefore the statement is true.

**#22**

- a) Inclusive or, you need proficiency in either language or both.
- b) Exclusive or, you can have either soup or salad, but not both.
- c) Inclusive or, you need either form of identification or both.
- d) Exclusive or, luckily you cannot both publish and perish.

**Unit 1.3**

#4b

$p$	$q$	$r$	$(p \wedge q) \wedge r$	$p \wedge (q \wedge r)$
$T$	$T$	$T$	$T$	$T$
$T$	$T$	$F$	$F$	$F$
$T$	$F$	$T$	$F$	$F$
$T$	$F$	$F$	$F$	$F$
$F$	$T$	$T$	$F$	$F$
$F$	$T$	$F$	$F$	$F$
$F$	$F$	$T$	$F$	$F$
$F$	$F$	$F$	$F$	$F$

Since the columns are identical the law is true.

#6 #8 a) b) #32