

1. Write three sentences that are propositions, and three that are not.
2. Negate the three propositions.
3. Let p be the proposition: I bought a lottery ticket. and q be the proposition: I won the million dollar jackpot. Express each of the following in English:
 - (a) $\neg p$
 - (b) $p \vee q$
 - (c) $p \rightarrow q$
 - (d) $p \wedge q$
 - (e) $p \leftrightarrow q$
 - (f) $\neg p \rightarrow \neg q$
 - (g) $\neg p \wedge \neg q$
 - (h) $\neg q \rightarrow \neg p$
 - (i) $\neg p \vee (p \wedge q)$
4. Let p be the proposition: You drive over 70 mph and q be the proposition: You get a speeding ticket. Write the following statements using p , q , negations and logical connectives:
 - (a) You do not drive over 70 mph.
 - (b) You drive over 70 mph, but you do not get a speeding ticket.
 - (c) You will get a speeding ticket if you drive over 70mph.
 - (d) If you do not drive over 70 mph then you will not get a speeding ticket.
 - (e) Driving over 70 mph is sufficient for getting a speeding ticket.
 - (f) You drive less than 70 mph but get a speeding ticket anyway.
5. For the following sentences, determine whether an inclusive or, or an exclusive or, is intended.
 - (a) Lunch comes with soup or salad.
 - (b) A grade of C or better in intermediate algebra is a prerequisite for Discrete Math.
 - (c) Fish or cut bait.
 - (d) You may pay in dollars or pesos.
 - (e) You may use a passport or a drivers licence as a photo id.

6. Write each of the following statement in the form **if p then q** .
- It is necessary to laugh at the boss's jokes to get promoted.
 - April showers bring May flowers.
 - Willy gets caught whenever he cheats.
 - You can access the web content only if you subscribe.
 - Janet will go swimming unless the water is too cold.
7. State the converse, contrapositive, and inverse of each of these conditional statements:
- If it snows today I will skip class.
 - I come to class whenever there is going to be a quiz.
 - \sqrt{x} is a real number unless x is negative.
 - $x^2 = 1$ only if $x = 1$ or $x = -1$
8. Construct a truth table for the proposition $(p \vee q) \rightarrow (p \oplus q)$ by finishing the table

p	q	$p \vee q$	$p \oplus q$	$(p \vee q) \rightarrow (p \oplus q)$
T	T			
T	F			
F	T			
F	F			

9. Construct a truth table for $(p \oplus q) \rightarrow (p \wedge q)$

p	q	$p \oplus q$	$p \wedge q$	$(p \oplus q) \rightarrow (p \wedge q)$
T	T			
T	F			
F	T			
F	F			

10. Construct a truth table for $(p \rightarrow q) \leftrightarrow (\neg q \rightarrow \neg p)$

p	q	$\neg p$	$\neg q$	$p \rightarrow q$	$\neg q \rightarrow \neg p$	$(p \rightarrow q) \leftrightarrow (\neg q \rightarrow \neg p)$
T	T					
T	F					
F	T					
F	F					