Exercise 3
Name:
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Given the simple statements:
a=: The number ends with 3.
b=: The number ends with 0.
c=: The number is divisible by 5.
d=: The number is prime

I. Write the following compound statements in symbolic form:

1. A number ends with 3 or 0. $a \vee b$
2. A number ends with 3 and it is prime. $a \wedge d$
3. If a number ends with 0, then it is not prime. $b \rightarrow \sim d$
4. A number is divisible by 5 if and only if it ends with 0. $c \leftrightarrow b$

Given the simple statements:
a=: The number ends with 2.
b=: The number ends with 5.
c=: The number is divisible by 6.
d=: The number is divisible by 3.

II. Write the following symbolic statements in words:

1. $a \vee b$ *(A number ends with 2 or 5.)*
2. $c \rightarrow (d \wedge a)$ (A number is divisible by 6, then it is divisible by 3 and ends with 2)

III. Determine whether the statement is true or false.
{Example: if 8+2 = 10, then 4 × 3 = 7 is FALSE
8+2=10 is TRUE, 4 × 3 = 7 is FALSE, $T \rightarrow F$ is F}

1. $-15 > -15$ is FALSE
2. If 8 − 3 = 11 or 5 is an odd number is TRUE

   8 − 3 = 11 is FALSE, 5 is an odd number is TRUE, F ∨ T is T
3. 1 = 0 and 15 is divisible by 3 is FALSE

   1 = 0 is FALSE, 15 is divisible by 3 is TRUE, F ∧ T is F
4. If a square has 4 equal sides, then a rectangle has two diagonals is FALSE

   a square has 4 equal sides is TRUE, a rectangle has two diagonals is FALSE, T→F is F
5. A triangle has one diagonal, if and only if a square has 4 equal sides is FALSE

   A triangle has one diagonal is FALSE, a square has 4 equal sides is TRUE, F↔T is FALSE

IV.Give the truth value of the following statements

1. $q \vee (r \wedge \sim q)$ when q is TRUE and r is FALSE

   Answer:

r	q	$\sim q$	$r \wedge \sim q$	$q \vee (r \wedge \sim q)$
F	T	F	F	T

2. $[\sim (p \rightarrow q)] \leftrightarrow (p \wedge \sim q)$ when p and q are FALSE

   Answer:

p	q	$\sim q$	$p \rightarrow q$	$\sim (p \rightarrow q)$	$p \wedge \sim q$	$[\sim (p \rightarrow q)] \leftrightarrow (p \wedge \sim q)$
F	F	T	T	F	F	T

3. $(\sim p \vee \sim q) \rightarrow [(r \leftrightarrow \sim q) \wedge p]$ when p is TRUE, q is TRUE, and r is FALSE

   Answer:

p	q	r	$\sim p$	$\sim q$	$(\sim p \vee \sim q)$	$(r \leftrightarrow \sim q)$	$[(r \leftrightarrow \sim q) \wedge p]$	$(\sim p \vee \sim q) \rightarrow [(r \leftrightarrow \sim q) \wedge p]$
T	T	F	F	F	F	T	T	T