Discrete Mathematics and Proof Unit 1 practice: Truth table for the conditional

Name _____ Date _____ Period _____

1. Is each conditional true or false? Check its hypothesis and its conclusion first.

(a) If 30 is even, then 30 is a multiple of 4.

(b) If 56 > 50, then 56 is odd.

(c) If 35 is a multiple of 5, then 35 < 40.

(d) If 50 is a perfect square, then 50 is even.

(e) If 7 + 9 = 16, then 7 < 9.

(f) If 25 is prime, then 25 + 2 is prime.

(g) If 15 is a multiple of 6, then 15 is a multiple of 4.

(h) If 4 is odd, then $4^2 > 50$.

2. Fill in the column of each statement for the rows P, Q = TT, TF, FT, FF. Use a helper column for each inner piece.

(a) $\neg Q \to \neg P$

(b) $\neg P \to \neg Q$

(c) $Q \to \neg Q$

(d) $P \to (P \wedge Q)$

(e) $(P \vee Q) \to Q$

(f) $\neg(Q \to P)$

Free sample from math.wiki for classroom use. Do not post. math.wiki

3. Each of these takes two steps.

(a) $P \to \neg Q$ is false. Is $Q \to \neg P$ true or false?

(b) Both $P \to Q$ and $P \to \neg Q$ are true. Is P true or false?

(c) Find the value of $(Q \to P) \to \neg R$ when P is true, Q is false and R is true.

(d) Give the column of $P \to (Q \wedge R)$ on P, Q, R (eight rows, fixed order).

4. (a) A bakery sign says: "If you buy at least 12 muffins, you get a free coffee." Hannah buys 18 muffins and does not get a free coffee. Which row of the table for the sign's promise is this, and was the promise broken?

(b) A school's rule says: "If it is sunny at noon, recess is outside." Over 20 school days it was sunny at noon on 15 days; recess was outside on 13 of the sunny days and on 3 of the other days. On how many days was the rule broken, and on how many was it true?

Free sample from math.wiki for classroom use. Do not post. math.wiki