

Name: _____

Please show all work.

1. An integer n is prime means $n > 1$ and the only positive divisors of n are 1 and itself.
 - (a) Write this definition in formal language using appropriate quantifiers.
 - (b) Negate the formal expression and simplify (show work)
 - (c) Write out the negation in words.

2. For each statement below determine whether it is true. If so, prove it (show work). If not, exhibit a concrete counterexample and explain why it is indeed a counterexample.
 - (a) If S and T are sets, $S \cup T = S \cap T \Leftrightarrow S \subseteq T$
 - (b) If S and T are sets, $S \cup T \subseteq S \cap T \Leftrightarrow S = T$

3. Consider the Diophantine equation $54x - 28y = 8$
 - (a) Use extended Euclid's algorithm to find the greatest common divisor of 54 and -28 and to find a certificate for it (show work)
 - (b) Find the general integer solution to the equation.
 - (c) Find three distinct particular integer solutions to the equation.

1	2	3	total (30)