Math 364 - Other Miscellaneous Problems
Fall 2008

95. Prove that $\sqrt{2}$ is irrational. In other words, prove that if r is a rational number then $r^2 \neq \sqrt{2}$.
96. Let m be an integer. Prove that if m^2 is odd, then m is odd.
97. Let x be an integer. Prove that if x^2 is not divisible by 4 then x is odd.
98. Let x and y be integers. Prove that if xy is even then either x is even or y is even.
99. Let x and y be integers. Prove that if xy is odd then both x and y are odd.
100. Let x be an integer. Prove that if 8 does not divide $x^2 - 1$ then x is even.
101. Let x, y and z be integers. Prove that is x does not divide yz then x does not divide z.
102. Let a and b be integers. Prove that if ab is odd, then both a and b are odd.
103. Let a and b be integers. Prove that if $a - b$ is odd then $a + b$ is odd.
104. Prove that there exist integers m and n so that $2m + 7n = 1$.
105. Prove that there do not exist integers m and n so that $2m + 4n = 7$.
106. Let a, b, and c be integers. Prove that if a divides $b - 1$ and a divides $c - 1$ then a divides $bc - 1$.