

### Math 3520 - Quiz 6

Name: \_\_\_\_\_

1. Prove: If  $8|n^2$  then  $4|n$ .
2. Prove: Let  $n \in \mathbb{Z}$  be odd. Then  $n^2 \equiv 1 \pmod{8}$ .
3. Answer and explain: Let  $n \in \mathbb{Z}$ . Then what are the possible values of  $n^2 \pmod{8}$ ?
4. Prove: Let  $(a, b, c)$  be a primitive Pythagorean triple. Then  $a$  and  $b$  are of opposite parity.
5. Prove: Let  $(a, b, c)$  be a primitive Pythagorean triple. Then  $4|ab$ .
6. Prove: Let  $(a, b, c)$  be a primitive Pythagorean triple. Then  $12|ab$ . Use Problem 5 and what we did in class Tuesday.
7. Let  $a, b, c \in \mathbb{Z}$ . If  $a|bc$  and  $\gcd(a, b) = 1$  then  $a|c$ .
8. Prove:  $\sqrt{3}$  is irrational.