Name: _____

Part 1: Definitions and Concepts

1) Let n be an integer. State the definition for n to be an <u>even integer</u>. Be precise: vague answers will be given no credit.

The integer *n* is even if there is some integer *k* such that n = 2k.

OR

$$\exists_{k\in\mathbb{Z}}(n=2k)$$

Partial credit varies based on what you said.

No credit if you do not specify the equation n = 2[something] somewhere.

2) Let n and m be integers. State the definition for n to <u>divide</u> m. Be precise: vague answers will be given no credit.

The integer *n* divides the integer *m* if there is some integer *k* such that m = kn.

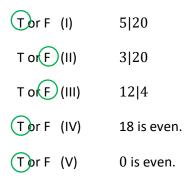
OR

n is odd if
$$\exists_{k \in \mathbb{Z}} (m = kn)$$

Partial credit varies based on what you said.

No credit if you do not specify the equation n = km or the incorrect equation kn = m somewhere.

3) Determine whether the following are true or false.



Part 2: Proofs

4) Let n be an even number. Prove that n + 7 is an odd number.

Let *n* be an even number. Then we can write n = 2k for some $k \in \mathbb{Z}$. Now we show that n + 7 is odd: n + 7 = 2k + 7 = 2k + 6 + 1 = 2(k + 3) + 1Because $k + 3 \in \mathbb{Z}$, the above equation shows that n + 7 is odd.