Math 301 Quiz #1a   Name: KEY

1. Using the definition of odd, clearly explain why 17 is odd.

$$17 = 2(8) + 1 \text{ and } 8 \in \mathbb{Z}.$$

2. Let A be the statement "6 is even" and let B be the statement "5 is composite". For each of the following, write TRUE or FALSE (**not** T or F), as appropriate.

   (a) B.

   FALSE

   (b) A and B.

   FALSE

   (c) A or B.

   TRUE

   (d) If A then B.

   FALSE

3. Prove: If x is an integer and $10 \mid x$ then $5 \mid x$.

   Proof: Hypothesis: $\boxed{\text{Let } x \text{ be an integer and } 10 \mid x.}$
   Then, $x = 10a$ for some integer a.
   So $x = 5(2a)$.
   $2a$ is an integer by the closure property of multiplication of integers.
   Conclusion: $\boxed{5 \mid x.}$

Math 301 Quiz #1b Name: KEY

1. Using the definition of odd, clearly explain why 13 is odd.

$$13 = 2(6) + 1 \text{ and } 6 \in \mathbb{Z}.$$

2. Let A be the statement "6 is even" and let B be the statement "5 is composite". For each of the following, write TRUE or FALSE (**not** T or F), as appropriate.

   (a) B.

   FALSE

   (b) A or B.

   TRUE

   (c) A and B.

   FALSE

   (d) If A then B.

   FALSE

3. Prove: If x is an integer and $14 \mid x$ then $7 \mid x$.

   Proof: Hypothesis: $\boxed{\text{Let } x \text{ be an integer and } 14 \mid x.}$
   Then, $x = 14a$ for some integer a.
   So $x = 7(2a)$.
   $2a$ is an integer by the closure property of multiplication of integers.
   Conclusion: $\boxed{7 \mid x.}$