Mathematics 300

Quiz 28 Name: Key

You must show your work to get full credit.

For the following say if they are true or false and then given a proof or disproof.

1. There are integers x and y such that

$$6x - 9y = 2.$$

True or False: False

Towards a contradiction assume this is true. Then there are integers $x, y \in \mathbb{Z}$ with

$$6x - 9y = 2$$

we can factor out a 3 to get

$$3(2x - 3y) = 2$$

As $2x - 3y \in \mathbb{Z}$ this implies $3 \mid 2$, which is a contradiction.

2. If a, b, and c are integers and $a \mid bc$, then $a \mid b$ or $a \mid c$.

There are many examples. True or False: False.

An easy one is $a = 4$, $b = 2$, $c = 6$. Then $bc = 2 \cdot 6 = 12$ and $a = 4 \mid 12$. But $4 \nmid 2$ and $4 \nmid 6$.