

# Math 2283 - Introduction to Logic

Quiz #3 - 2010.09.01

Solutions

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Determine if each of the following statements are true or false. If false, give an example which makes the statement false. If true, then given an argument as to why it is true.

1. If  $x$  is divisible by 3 or divisible by 4, then  $x$  is divisible by 12.

False, let  $x = 6$ .

2. If  $x$  is divisible by 3 and 4, then  $x$  is divisible by 12.

This is true. If we assume the antecedent, then  $x = 3 \cdot 4y$ , therefore,  $x = 12y$  and thus  $x$  is divisible by 12.

3. If  $x$  is divisible by 12, then  $x$  is divisible by 3 and 4.

Also true. If  $x$  is divisible by 12, then  $x = 12y = 3 \cdot 4y$ . Therefore,  $x$  is divisible by 3 and  $x$  is divisible by 4.

4. If  $x$  is divisible by 12, then  $x$  is divisible by 3 or divisible by 4.

This is true from problem 3.

5.  $x$  is divisible by 12 iff  $x$  is divisible by 3 and 4.

This is true by problems 2 and 3.