MAT137

- Enrol in a tutorial if you haven't already done so. Tutorials start on Monday. You will be able to switch tutorials even after registration closes.
- Course website: Quercus and `http://www.math.toronto.edu/khesin/teaching/mat137.html`
- Today we will discuss conditionals.
- Homework before Tuesday's class: watch videos 1.10, 1.11, 1.12, 1.13.

True or False

1. If $x \in \mathbb{Z}$, then $x \in \mathbb{R}$.
2. $x \in \mathbb{R} \Rightarrow x \in \mathbb{Z}$.
3. $x > 7$ if and only if $5x > 35$.
4. $x > 7 \Leftrightarrow 5x > 40$
5. $x > 7 \Leftarrow 5x > 20$

Friends

All of my friends' names begin with a vowel. Which of the following statements are definitely true?

1. Alice is my friend.
2. Bob is not my friend.

Write negation of the statement:

If this person is my friend, his/her name begins with a vowel.

A set

Let A be a subset of the real numbers. Suppose that we know that the following statement is true:
If $x \in A$ *and* $x > 3$, *then* $x = 12$.

Which of the following are possible?

1. $A = (0, 3)$.
2. $A = \{2, 4, 12\}$.
3. $A = \{1, 2, 12\}$.
4. $A = [2, 12]$.

Negation

Four cards lie on a table in front of you. Each card has a letter on one side and number on the other. Consider the following statement:

If a card has an even number on one side, then it has a vowel on the other side.

Which of the following statements are equivalent to the original, which are its negation, and which are neither?

1. If a card has an odd number on one side, then it has a vowel on the other side.
2. If a card has a vowel on one side, then it has an even number on the other side.
3. There is a card which has an even number on one side and a consonant on the other side.
4. There is a card which has an odd number on one side and a vowel on the other side.
5. If a card has an consonant on one side, then it has an odd number on the other side.

Consequences of a False statement

Attention: A false statement can imply anything!

Are the following statements true?

1. $\exists y \in \mathbb{Z}$ such that $\forall x \in \mathbb{Z} \quad x < y$
2. $[\,\exists y \in \mathbb{Z}$ such that $\forall x \in \mathbb{Z} \quad x < y\,]$ implies $[\,1 = 2\,]$
3. $[\,\forall y \in \mathbb{Z}\ \exists x \in \mathbb{Z}$ s.t. $\quad x \geq y\,]$ implies $[\,2 \times 2 = 5\,]$