

# MATH135 Homeworks

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June 10, 2023

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# Homework 1

## Assignment 1

1.
  - a) The smallest prime number can either be 2 or not 2, making “The smallest prime number is 2” a valid statement.
  - b) The sum of  $\cos^2 \theta$  and  $\sin^2 \theta$  could be 1 or not 1, so “ $\cos^2 \theta + \sin^2 \theta = 1$ ” is a valid statement.
  - c) It is either possible for every integer to be of the form  $2k$  or  $2k + 1$  or there exists at least one exception, so “Every integer  $x$  is of the form  $2k$  or  $2k + 1$ ” is a valid statement.
  - d) 0 can either be even or odd or it could not be either, making “The number 0 is neither even nor odd” a valid statement.
  - e) A question is not true or false; therefore, “Is 3  $\leq$  2 true?” is not a valid statement.
2.
  - a)  $\forall x \in \mathbb{Z}, x^2 > 0$
  - b)  $\forall x \in \mathbb{R}, x^3 \in \mathbb{R}$
3.
  - a)  $\exists x \notin \mathbb{Z}, \forall y \notin \mathbb{R}, x + 2y > 3\sqrt{2}$
  - b)  $\forall a \notin \mathbb{N}, \exists b \notin \mathbb{Q}$