

## In-Class Worksheet

Discrete Math & Functional Programming— CSCI 054— Spring 2025

Instructor: Osborn

**even:** an integer  $k$  is even if and only if there exists an integer  $r$  such that  $k = 2r$

**odd:** an integer  $k$  is odd if and only if there exists an integer  $r$  such that  $k = 2r + 1$

**divides:** given integers  $k$  and  $m$ ,  $k|m$  if and only if there exists an integer  $r$  such that  $m = kr$ . This is equivalent to saying that  $m \bmod k = 0$  or that  $k$  evenly divides  $m$ .

**prime:** an integer  $k > 1$  is prime if the only positive integers that evenly divide  $k$  are 1 and  $k$  itself.

**composite:** an integer  $k > 1$  is composite if it is not prime.

**perfect square:** an integer  $k$  is a perfect square if and only if there exists an integer  $r$  such that  $k = r^2$

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For all positive integers  $n$ ,  $2n = n^2$ .

Let  $x$  be any integer. If  $x$  is a perfect square, then  $4x$  is a perfect square.

$$\forall i \in \{1, 2, \dots, n\} : [\exists j \in \{1, 2, \dots, n\} : (i \neq j) \wedge (A[i] = A[j])]$$

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$$\exists y \in \mathbb{R} : \forall x \in \mathbb{R} : x < y \tag{1}$$

$$\forall x \in \mathbb{R} : \exists y \in \mathbb{R} : x < y \tag{2}$$

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$$\neg(\forall i \in \{1, 2, \dots, n\} : [\exists j \in \{1, 2, \dots, n\} : (i \neq j) \wedge (A[i] = A[j])])$$