

Name

UNIVERSITY
OF WYOMING

COSC 2300—Fall 2026

Computer Science

Discrete Structures

Quiz 2

Tuesday, September 24, 2026

Determine whether each of the following statements is true or false.

- (a) For all integers m and n , if $m < n$ then there exists an integer k such that $m < k < n$.

If $m=2$ and $n=3$, there is no integer between them.

____ (True/False)

- (b) There exists an integer m such that for every integer $n > m$, we have $n^2 > m$.

The choice $m=0$ works.

____ (True/False)

- (c) There exists an integer m such that for every integer $n < m$, we have $n^2 < m$.

If $n < -1 - |m|$ then $n^2 > m$.

____ (True/False)

- (d) There exists a real number x such that for every real number $y > x$, we have $y > x^2$.

The choice $x=0$ works.

____ (True/False)

- (e) For every real number x , there exists a real number $y < x$ such that $y^2 > x$.

The choice $y = -1 - |x|$ works.

____ (True/False)

- (f) $(\forall x \in \mathbb{R})(\exists y \in \mathbb{R})(x + y = x)$

The choice $y=0$ works.

____ (True/False)

- (g) $(\exists x \in \mathbb{R})(\forall y \in \mathbb{R})(x + y = y)$

The choice $x=0$ works.

____ (True/False)

- (h) $(\forall m \in \mathbb{Z})(\exists n \in \mathbb{Z})(mn = 1)$

If $m \neq \pm 1$, there is no such n .

____ (True/False)

- (i) $(\exists x \in \emptyset)(x^2 < 0)$

There is no element $x \in \emptyset$.

____ (True/False)

- (j) $(\forall x \in \emptyset)(\exists y \in \mathbb{R})(y^2 < 0)$

There is no element $x \in \emptyset$.

____ (True/False)

$(\exists x \in \emptyset)(\forall y \in \mathbb{R})(y^2 \geq 0)$ is false.

Negating this, the original statement is true (and vacuously so).