CS 173, Fall 18 Examlet 5, Part B

Name:_____

NetID:_____ **Lecture: B**

Discussion: Friday 11 12 1 2 3 4

1. (5 points) Suppose that $|A| = p$ and $|B| = q$, $p \leq q$. How many different one-to-one functions are there from A to B?

2. (10 points) Check the (single) box that best characterizes each item.

   If a function from $\mathbb{R}$ to $\mathbb{R}$ is increasing, it must be one-to-one. true ☐ false ☐

   $f : \mathbb{N} \to \mathbb{R}$, $f(x) = x^2 + 2$ onto ☐ not onto ☐ not a function ☐

   $f : \mathbb{N} \to \mathbb{N}$, $f(x) = 3 - x$ one-to-one ☐ not one-to-one ☐ not a function ☐

   We painted 12 mailboxes. There were 5 colors to choose from and each mailbox is painted with a single color. By the pigeonhole principle, every color appears on at least two mailboxes. true ☐ false ☐

   $\exists y \in \mathbb{N},\ \forall x \in \mathbb{N},\ x = xy$ true ☐ false ☐

Name:_____

NetID:_____ **Lecture: B**

Discussion: Friday 11 12 1 2 3 4

1. (5 points) Suppose that $|A| = p$, $|B| = q$, $|C| = n$. How many different functions are there from A to $B \times C$?

2. (10 points) Check the (single) box that best characterizes each item.

If a function from $\mathbb{R}$ to $\mathbb{R}$ is strictly increasing, it must be one-to-one. true ☐ false ☐

$g : \mathbb{N} \to \mathbb{Z}$
$g(x) = |x|$ one-to-one ☐ not one-to-one ☐ not a function ☐

$g : \mathbb{R} \to \mathbb{R}$
$g(x) = \sin(x)$ onto ☐ not onto ☐ not a function ☐

We painted 12 mailboxes. There were 5 colors to choose from and each mailbox is painted with a single color. By the pigeonhole principle, there is a color that appears on at least two mailboxes. true ☐ false ☐

$\forall x \in \mathbb{Z},\ \exists y \in \mathbb{Z},\ x \neq y$ and $x + y = 0$ true ☐ false ☐