

## Day 3

## Anywhere

Turn to someone sitting near you who you haven't met before (or who you haven't talked to much before). Take about 3 minutes to discuss:

If you could live anywhere on this planet, where would you choose to live and why?

4. "There exist no integers  $x$  and  $y$  such that  $21x + 30y = 1$ ."

This statement is...

(A) True.

(B) False.

# Sets, Functions, and Equivalence Relations

1. Let  $\mathbb{Z}$  be the set of integers. Define a relation  $R$  where  $aRb$ , for  $a, b \in \mathbb{Z}$ , means that  $|a - b| \leq 1$ . The relation  $R$  is...

- (A) An equivalence relation.
- (B) Reflexive and symmetric, but not transitive.
- (C) Reflexive and transitive, but not symmetric.
- (D) None of the above.

2. Let  $S$  be the set of positive real numbers. The function  $f: S \rightarrow S$  given by  $f(x) = x^2$  is...

- (A) Neither injective nor surjective.
- (B) Injective but not surjective.
- (C) Surjective but not injective.
- (D) Bijective.

Recall: injective = one-to-one, surjective = onto, bijective = one-to-one and onto.

3. Let  $\mathbb{Z}$  be the set of integers. Define a relation  $R$  where  $aRb$ , for  $a, b \in \mathbb{Z}$ , means that  $a + b$  is even. The relation  $R$  is...

- (A) An equivalence relation.
- (B) Reflexive and symmetric, but not transitive.
- (C) Reflexive and transitive, but not symmetric.
- (D) None of the above.

4.  $\neq$  is a relation on the set  $\mathbb{R}$  of real numbers. It is...

- (A) Reflexive.
- (B) Symmetric.
- (C) Transitive.
- (D) None of the above OR more than one of the above.