

MATH310 Groupwork 2022-08-12

NAME:

1. Prove that $\mathbb{Z} \approx \mathbb{Z}^+$.

Solution:

2. Prove that $(-\frac{\pi}{2}, \frac{\pi}{2}) \approx \mathbb{R}$ using a familiar trig function.

Solutions:

3. Welcome to the Infinite Hotel! A hotel has infinitely many rooms numbered R_1, R_2, R_3, \dots but unfortunately they're all full. Currently guest G_1 is in room R_1 , guest G_2 is in room R_2 , and so on. Luckily the guests are generous and don't mind moving rooms.

- (a) One new person shows up at the front desk. Even though the hotel is full, the manager can create a free room by moving other guests. How?

Solution:

- (b) One-hundred new people show up at the front desk. How can the manager accommodate them all?

Solution:

- (c) Infinitely many new people labeled P_1, P_2, P_3, \dots show up at the front desk. How can the manager accommodate them all?

Solution: