MATH 271 – Summer 2016
Quiz 4 – solutions
Thursday, August 11. Duration: 50 minutes

For each of the following questions, give a brief explanation on how you get the answer. You do not have to simplify your answer to a number.

1. (*4 points*) Consider all four-digit positive integers who digits are chosen from $\{1, 2, 3, 4, 5, 6\}$.

(a) How many of those numbers have at least one digit that is a 6?

(b) How many of those numbers have at least one digit that is a 6 **and** at least one digit that is a 5?

2. (*4 points*) Consider the letters of the word *CANADIAN*.

(a) How many ways can the letters be arranged?

(b) How many of those arrangements do **not** have the two N's next to each other?

Name:_____ Id #:_____

3. **(***7 points***)** Let $f\colon \mathbb{Z} \to \mathbb{Z}$ and $g\colon \mathbb{Z} \to \mathbb{Z}$ be functions defined by $f(x) = \left\lceil \frac{x+1}{3} \right\rceil$ and $g(x) = 2x$ for each $x \in \mathbb{Z}$.

(a) Is g one-to-one? Prove your answer.

(b) Is f onto? Prove your answer.

(c) Is $f \circ g$ one-to-one? Prove your answer.

(d) Is $g \circ f$ onto? Prove your answer.