

## Quiz 2 (Wednesday May 29th)

AndrewID:

Name:

Total: 125 points. Full score: 100 points.

1. (25 pts) You throw a die 5 times. What's the probability of observing a 3 for the first time on the 5-th throw?
2. (25 pts) Prove that

$$g(x) = \begin{cases} p & \text{if } x = 1 \\ 1 - p & \text{if } x = 0 \\ 0 & \text{o/w} \end{cases}$$

where  $p \in [0, 1]$  is a valid pmf (probability mass function).

3. (25 pts) Given the pdf  $f(x) = \mathbb{1}_{[0,1]}(x)$  for the r.v.  $X$ , compute

$$P(X \in [1/2, 2/3]).$$

4. (25 pts) Let the cdf (cumulative density function) of the r.v.  $X$  be

$$F(x) = x\mathbb{1}_{[0,1]}(x) + \mathbb{1}_{(1,\infty]}.$$

Compute the pdf (probability density function) of  $X$ .

5. (25 pts) For the r.v.  $X$  in exercise 2, compute  $E[h(X)]$  where

$$h(x) = x^3.$$