Name _____

Student Number _____

Tutorial Section _____

STA 256 f2018 Test 2

Question	Value	Score
1	10	
2	10	
3	25	
4	15	
5	20	
6	20	
Total = 100 Points		

10 points

1. Let X have a Poisson distribution with $\lambda = 2$. What is $F_x(1.34)$? The answer is a number. Show some work. **Circle your answer**.

10 points

2. Prove that the Binomial probabilities sum to one.

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25 points

3. The continuous random variable X has cumulative distribution function

$$F_x(x) = \begin{cases} 1 - \frac{1}{x^3} & \text{for } x \geq 1 \\ 0 & \text{otherwise} \end{cases}$$

(a) What is $P(-1 < X < 2)$? The answer is a number. **Circle your answer**.

(b) Find the probability density function $f_x(x)$. Show a little work. Do not forget to indicate where the density is non-zero.

Continued on page 4

15 points

4. Let X be a normally distributed random variable with $\mu = 100$ and $\sigma = 15$. What is $P(100 < X \leq 120)$? The answer is a number. Show your work. **Circle your answer**.

Continued on page 5

20 points

5. The random variable X has probability density function $f_x(x) = \frac{e^x}{(1+e^x)^2}$, for all real x. What is the cumulative distribution function $F_x(x)$? Show your work.

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20 points

6. The continuous random variables X and Y have joint probability density function

$$f_{xy}(x,y) = \begin{cases} 10\,x^2 y & \text{for } 0 \le x \le 1 \text{ and } 0 \le y \le x \\ 0 & \text{otherwise} \end{cases}$$

Find the marginal density function $f_y(y)$. Show your work. Do not forget to indicate where the density is non-zero.