

Math 365 Final Exam

- The final exam is Wednesday March 16 from 10-11:50am in MNB 104.
- The final is comprehensive and will cover Chapters 1, 2, 3 (omit sections we did not cover).
- You may use your calculator, the front cover of your book, and any table in the back of the book.
- You may use one page of notes ($8\frac{1}{2}$ x 11 both sides).
- The in-class review sheet from Tuesday (with answers) is posted on our webpage.
- A second review sheet (with answers) is posted on our webpage.
- I will have office hours on Monday from 1-2pm and on Tuesday from 2-4pm. If you cannot come at these times and need help, please contact me and we will try to make an appointment at another time.

Suppose that squirrels come to Dr. Burton's window to get a nut according to a Poisson process with an average of 6 per hour.

1. How long should Dr. Burton expect to wait when she arrives in the morning before the first squirrel comes to her window?
2. What is the probability that more than 2 squirrels will come in the first 10 minutes?
3. What is the probability that she will have to wait more than 15 minutes for the first squirrel to arrive?

Suppose that the scores, X , on a certain Mathematics test followed a normal distribution, $X \sim N(80, 16)$.

1. Approximately what score would a student have to get to be in the 90th percentile?

2. Between what 2 scores did 95.44% of the scores lie?

Suppose that the state lottery sells tickets where each ticket has a 0.05 probability of being a winner.

1. Suppose I bought a pile of tickets and had 5 winners. What is a good guess as to how many I bought?
2. The state is having a promotion where each person who buys gas at the local gas station gets a free lottery ticket. What is the probability that the first winner is among the first 25 people?
3. What is the probability that the first winner is after the 30th customer?
4. If I buy 150 tickets what is the probability that I will have at least 10 winning tickets?

I have a (fair) 6-sided die where four sides have a 1 and two sides have a 4.

1. Roll the die and let X be the face showing. What is the p.m.f. for X ?

2. What is the expected value of X ?

Short Answer:

1. Suppose X is a R.V. with $E[X - 5] = 10$ and $E[X^2] = 500$. Then $\mu =$ _____ and $\sigma^2 =$ _____.
2. Suppose $X \sim b(n, 0.1)$ and $\mu = 12$, then $n =$ _____.
3. Suppose X is a R.V. with m.g.f. $M(t) = \frac{3}{4}e^{-4t}$. Then $\mu =$ _____.
4. If X is a R.V. with p.m.f. $f(x) = \frac{1}{10}$, then X has a _____ distribution.
5. True or False: If A and B are independent, then they cannot be mutually exclusive.
6. True or False: If A and B are mutually exclusive, then they must be independent.
7. True or False: $P(A \cap B) \leq P(A) \cdot P(B)$.
8. True or False: If X has p.d.f. $f(x) = 0.5x^2$, then $P(X = 1) = 0.5$.
9. True or False: If X has a gamma distribution with $\theta = 2$ and $\alpha = 4$, then $X \sim \chi^2(2)$.
10. True or False: $F(x) = P(X \geq x)$.