**Mini Math**

November 22

1. In a certain university 24% of the students are first year students. If a student is in their first year there is a 75% chance that they live on campus. If a student is not in their first year, there is only a 34% chance that they live on campus.

   (a) Draw a tree diagram to represent this problem.

   (b) Use your tree diagram to construct a contingency table for this scenario.

   (c) If a randomly selected student lives on campus, what is the probability that they are not in their first year?

   (d) Is being a first-year student independent of living on campus? Show why/why not.

**Mini Math**

November 24

Suppose that the number of Pieces of Wow chicken Brenden eats, $C$, on a given visit has the following probability distribution.

| $c$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| $P(C = c)$ | 0.01 | 0.1 | 0.2 | 0.3 | 0.3 | 0.01 | 0.01 | 0.01 | 0.06 |

You may assume that Brenden's visits to Wow chicken are independent. Notice we are also assuming Brenden has implemented a diet that restricts his chicken intake to 8 pieces a visit.

1. What is $E[C]$?

2. What is $Var[C]$?

   Now Suppose that each piece of chicken costs \$1.50, and Brenden (a delightful customer) always feels compelled to give a \$4.50 tip. Let $M$ be the amount of money Brenden spends.

3. What is $E[M]$?

4. What is $Var[M]$?

5. Suppose Brenden visits WOW Chicken 4 successive days in a row. Assume days are independent. What is the probability he eats exactly one piece of chicken on one day and two or more pieces of chicken on all other days?

**Mini Math**

November 26

Suppose that historically Leif wins $\frac{4}{9}$ of the League of Legends matches he plays.

1. Let $X$ be the number of matches it takes for Leif to win, if he plays matches until he wins. Determine each of the following:
   (a) $P(X > 2)$

   (b) $P(X = 2 \cup X = 3)$

   (c) $E(X)$

   (d) $Var(X)$

   (e) What assumptions are we making in order to use the model in parts a-d?

2. Suppose Leif plays $n$ games.

   (a) How many of the $n$ games is Leif expected to win?

   (b) Leif starts his games binge by eating 4 Oreo cookies and Rewards himself with two Oreo cookie for every game he wins. How many Oreo cookies should he expect to eat if he plays 50 games.

   (c) What is the probability Leif eats less than 7 Oreo cookies?

1. Dr. Vince is training for the math olympiad. His running historic average is 99 questions out of every 100. For this problem assume questions are independent.

   (a) When practicing, what is the probability that he doesn't get a question correct until his 5th attempted problem?

   (b) When completing a 20 question competition, what is the probability Dr. Vince gets more than 4 questions correct?

   (c) Suppose Dr. Vince eats 2 chocolate muffins for every problem he gets right and does 50 pushups for every question he gets wrong. Every muffin contains 53 calories and pushups burn 7 calories per 10 pushups. If Dr. Vince completes 100 problems, what is his expected net calorie change?

   (d) Let $C$ be the net calorie change for Dr. Vince in part (c). Determine $Var(C)$

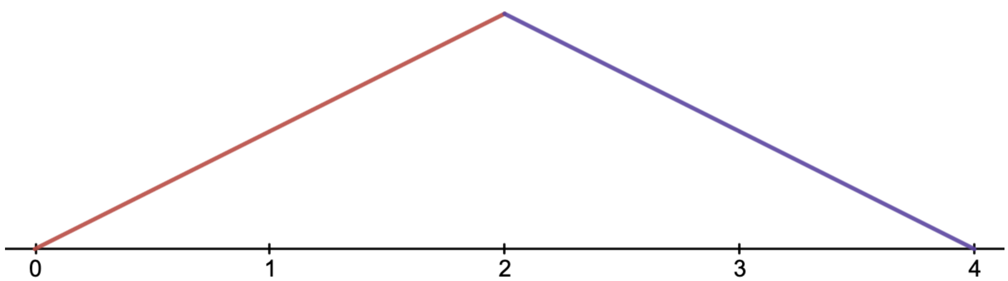
   (e) Are the assumptions made in this problem realistic? Why or Why not?

2. Brenden's late time on Friday morning's class follows an exponential distribution. Let $L$ be Brenden's late time. The probability density function, $f(l)$ is shown below.


(a) Shade the region that represents $P(L \geq 12)$

(b) Shade the region that represents $P(2 \leq L \leq 6)$

3. The graph below represent the pdf, $f(y)$, for a random variable $Y$ (not drawn to scale).




(a) Fill in piecewise function for the pdf below:

$$f(y) = \begin{cases} & 0 \leq y \leq 2 \\ & 2 \leq y \leq 4 \end{cases}$$

(b) Determine $P(Y < 1)$

(c) Determine $P(1 < Y < 3)$

**Mini Math**
December 3

1. Dan buys Roses and Tulips for his garden from the local farmer's market. The distribution of rose heights is approximately normal with a mean of 12 cm and a standard deviation of 22 mm.

   (a) For a rose Dan randomly selects from the market, what is the probability that the rose will be taller than 110 mm?

   (b) For tulips sold at the market, there is a 0.876 probability that a tulip will have a height greater than 78mm. For all the flowers at the market, 60% are roses and 40% are tulips. For a flower selected randomly from the market, what is the probability the flower will have a height greater than 78 mm?

   (c) Given that Dan randomly selects a flower with a diameter greater than 78 mm, what is the probability that the flower is a rose?