NYCCT MAT2572 Halleck Spring 2016 Exam 2 v1

* You must use a graphing calculator.
* At the end of class, be sure to turn in your formula sheet (1 sheet, 2 pages, hand-written), worth 10%.

1. (10 pts) The formula **=$A2\*C3** is located in cell D1.
   * 1. What does cell D1 evaluate to?
     2. If this was copied and pasted into cell **B4**, what would the resulting formula be?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** |
| **1** | 2 | 5 | 4 | **=$A2\*C3** |
| **2** | 3 | 3 | 8 | 6 |
| **3** | 5 | 3 | 3 | 4 |
| **4** | 4 | ????????? | 4 | 9 |

1. (20 pts) Based on recent polls, NYC Millennials support Sanders at 60% rate. Suppose that a class of 30 consists entirely of Millennials.
   1. Find an expression for the expected number of supporters in the class by using the definition of expectation.
   2. Write the support by the ith student Xi as a distribution (2 row table).
   3. Use b. to find .
   4. Find the expected number of supporters in the class by using .
   5. Find the standard deviation for Sanders’ support in the class.

Extra (2 pts): provide an interpretation for part e.

1. (35 pts) Let.
   1. Find *a* so that fY (y) is a PDF.
   2. Graph fY (y) from 0 ≤ y ≤ 4 (plot every 0.5).
   3. Find and graph FY (y), the corresponding CDF, from 0 ≤ y ≤ 4 (plot every 0.5).
   4. Find. Graph the inequality on your plot from part b) and shade the area representing the probability.
   5. Find the expectation and label on your plot from part b)
   6. Find the median and label on both graphs (the first with a vertical line and the second with a horizontal line and a vertical line).
   7. Compare the relative positions of the median and the expectation. Explain how the comparison relates to any skewing.
2. (25 pts) Two chips are drawn at random and without replacement from an urn that contains five chips, numbered 1 through 5. If the max of the chips drawn is odd, the random variable X = −2; if the max of the chips drawn is even, X = 4.
   1. Use a 5 x 5 grid with the diagonal filled in to find the intermediate outcomes. Circle those that are odd and count them. Use the count to write X as a table with 2 rows.
   2. Using the definition, find the moment-generating function for X.
   3. Write X as a linear function of a Bernoulli distribution.
   4. Use the table to find the MGF of this Bernoulli distribution.
   5. Use your results from b and c and a theorem to find the MGF of X.

Extra (10 pts) Let Y be a uniform random variable defined over the interval (1, 4).

* 1. Find a formula for the rth moment of Y about the origin.
  2. Use the formula of a. to find the first 4 moments.
  3. Use b. and binomial expansion to find σ2 = E[(Y −μ)2].
  4. Use b. and binomial expansion to find E[(Y −μ)4].
  5. Use c. and d. to find the Kurtosis γ2.

|  |  |  |
| --- | --- | --- |
| **Distribution** | ***fY*(*y*)** | ***MX*(*t*)** |
| Binomial B(n, p) |  |  |
| Geometric (counting failures only) |  |  |
| Negative Binomial  (counting failures) |  |  |
| Poisson |  |  |
| Uniform |  |  |
| Uniform discrete |  |  |
| Normal |  |  |
| Exponential |  |  |
| Gamma |  |  |