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|---|---|
| **Elementary Statistics** | **Name:** _____ |
| **Extra Credit 2** | **Due Dates:** _____ |

**Your solutions must be consistent with class notes & resources.**

**Be Neat, Organized, and No Work $\Leftrightarrow$ No Points**

**Submit as one file, portrait style, pages in order, and same format.**

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1. **A basketball coach has 3 girls and 7 boys in his basketball team, and he needs to select 5 players to start the game. Assume all players can play all positions.**

   (a) **(2 points) How many ways can he select 5 players?**

   **(a)** _____

   (b) **(2 points) How many ways can he select 3 boys and 2 girls?**

   **(b)** _____

   (c) **(3 points) What is the probability that he selects 3 boys and 2 girls?**

   **(c)** _____

   (d) **(3 points) What is the probability that he selects at least 1 girl? Final answer in reduced fraction.**

   **(d)** _____

   (e) **(3 points) What is the probability that he selects at least 1 boy? Final answer in reduced fraction.**

   **(e)** _____

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**2. Consider a city sponsored lottery that you select 3 different numbers in any order ranging from 1 to 25 and the fundraisers draw 3 numbers that are considered as winning numbers.**

**(a) (5 points) Let $x$ be the number of winning numbers that you have, and $P(x)$ be the probability of $x$ winning numbers and $n-x$ losing numbers.**

**$W$ Total winning numbers, $L$ Total losing numbers, $n$ total numbers drawn, and $N$ Total numbers drawn from.**

| $x$ | $P(x)$ | $P(x)$ |
|---|---|---|
| | **Using** $\frac{{}_W C_x \cdot {}_L C_{n-x}}{{}_N C_n}$ **notation** | **Reduced Fraction Only** |
| **3** | | |
| **2** | | |
| **1** | | |
| **0** | | |

**(b) (2 points) Use your calculator to find the mean $\mu$.**

**(b)** _____

**(c) (3 points) Use your calculator to find the exact value for the variance $\sigma^2$ in reduced fraction.**

**(c)** _____

**3. At a local fundraising, you can purchase a ticket for $5, and select 3 numbers in any order from 1 to 20. The fundraisers also select 3 numbers.**

**If you have all 3 winning numbers, then you win $75.**
**If you have exactly 2 winning numbers, then you win $20.**
**And finally, if you have exactly 1 winning number, then you win $5, otherwise nothing.**

**(a) (5 points) Complete the table below.**

| The Number of Winning Numbers | The Amount of Net Gain | The Probability of Net Gain In Reduced Fraction |
|---|---|---|
| **3** | | |
| **2** | | |
| **1** | | |
| **0** | | |

**(b) (2 points) Use your calculator to find the expected value per ticket.**

**(b)** _____

**(c) (2 points) Are the fundraisers making or losing money per ticket sold? Explain.**

**(c)** _____

**4. A CNN study reveals that 80% of women are in favor of stricter gun control. If we randomly select 400 women,**

**(a) (2 points) Find the probability that the number of women in favor of stricter gun control is exactly 310.**

**(a)** _____

**(b) (3 points) Find the probability that the number of women in favor of stricter gun control is fewer than 310.**

**(b)** _____

**(c) (3 points) Find the probability that the number of women in favor of stricter gun control exceeds 310.**

**(c)** _____

**(d) (3 points) Find the probability that the number of women in favor of stricter gun control is between 304 and 336, inclusive?**

**(d)** _____

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**5. Lisa is a softball player with the batting percentage of 0.25.**

**(a) (2 points) Find the probability that she has a hit on exactly the 4th at bat.**

**(a)** _____

**(b) (2 points) Find the probability that she has a hit after the 4th at bat.**

**(b)** _____

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**6. (3 points) Mark is a car salesman that sells in average 12 cars per month. Find the probability that he sells between 10 and 15 cars, inclusive, per month?**

**6.** _____

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