

Due by 5:00pm Friday, September 25. Send a PDF with your solutions to blins@hsc.edu.

1. **The Numbers Racket.** Before states starting running their own lotteries, many cities had lotteries run by the mob. These illegal lotteries were simple. Player could pick any three digit number (from 000 to 999), and pay \$1 to play. Each day one winning number would be randomly selected, and anyone who picked that number would win \$600. Find the expected value, variance, and standard deviation for one game ticket.

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2. The heights of women ages 20-29 in the USA are roughly normally distributed with an average of $\mu = 64.2$ inches and a standard deviation of $\sigma = 2.8$. Draw and label a bell curve showing the distribution of heights of women. Make sure to label the heights that are exactly one and two standard deviations above and below the average.

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3. How tall would a woman in her 20's be if she was in the 80th-percentile for height?
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4. Scores on the Medical College Admissions Test (MCAT) are roughly normally distributed with a mean $\mu = 25.3$ and a standard deviation $\sigma = 6.5$.

(a) What is the z -value for a student who gets a score of 35?

(b) Estimate the probability of a student getting a score of 35 or more on the MCAT exam.

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5. For each of the following random variables, determine whether it is continuous or discrete.

(a) The amount of snow (in inches) that Farmville will get this winter.

(b) The number of phone calls you get in one day.

(c) The weight (in pounds) of a random person.

(d) The number of children in a randomly selected family.

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6. Suppose that a restaurant earns an average daily profit of $\mu = \$3,000$, with a standard deviation of $\sigma = \$2,000$. Assuming that the restaurant will be open 350 days next year, and that each day's profit is independent and has the same μ and σ , describe the distribution of the sample mean daily profit \bar{x} over the next year. That is, what is its shape, center, and spread?
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