HOMEWORK WEEK #2

1. Solve the following questions about the specified normal random variables

    (a) $X \sim N(26, 54)$ (i.e., mean of 26 and variance of 54)
        - $p(24 < X < 30) = ?$
        - Solve for c such that $p(X < 45) = p(Z < c)$, where $Z \sim N(0, 1)$
        - Find lb and ub on the symmetric CI such $p(lb < X < ub) = 0.90$

    (b) $Y \sim N(43, 23)$ (i.e., mean of 43 and variance of 23)
        - $p(40 < Y < 50) = ?$
        - Solve for c such that $p(Y < 35) = p(Z < c)$, where $Z \sim N(0, 1)$
        - Find the lb and ub on the symmetric CI such $p(lb < Y < ub) = 0.99$

2. Modify the R code YahtzeeFirstRoll.R to answer the following questions:

    (a) Approximate probability of the "maxnumber" random variable equaling one when rolling four dice

    (b) Approximate probability of the "maxnumber" random variable equaling three or more when we roll six dice

    (c) In Yahtzee, there are two ways to roll what is called a "large straight". You either need to a) roll a one, a two, a three, a four, and a five on your five dice, b) roll a two, a three, a four, a five, and a six on your five dice. Approximate the probability of rolling a large straight with 5 dice.

3. We are going to write a Monte Carlo simulation in R to simulate the flipping of a series of coins.

    (a) Before you start working on this problem, write down a series of 25 made-up coin flips without using R or any other randomizing device
        (e.g., {HTTHTHTHHHTHTTTTTHTHTHTHTT}).

    (b) Modify the R code FlippingCoinsPartial.R to simulate the approximate cdf of the random variable equal to the longest streak in a series of 25 fair coin flips when you run 100,000 simulations. Every spot where you observe "XXX" in the code indicates something that you will need to fill in for your simulation to work. I am pasting a copy of the cdf that my simulation created below for your reference.

    (c) Acording to the cdf, what is the probability of having a streak of more than 5 coins show up?

    (d) Using the series of coin flips you constructed before beginning this problem, what is the probability of having a streak longer than *your* longest streak?

CDF in 100,000 Sims.