Formulas you will be given – know what they mean and how to use them

- For binomial random variable: $m = np$ and $s = \sqrt{npq}$
- For a discrete distribution: $\mu = \Sigma[xP(x)]$
- $z = \dfrac{observation - \mu}{\sigma}$

1) Consider the following discrete distribution for the number of books read over the summer for Stat 201 students.

Number of Books	P(x)
0	.5
1	.1
2	.1
3	.1
4	.1
5	.1

    a. Show that this is a valid discrete distribution.

    b. Find the mean of this distribution.

2) Consider the following discrete distribution for the an unfair die at a casino

| Die side	P(x)
1	.025
2	.4
3	.4
4	.1
5	.025
6	.05

    a. Show that this is a valid discrete distribution.

    b. Find the mean of this distribution. Why might this unfair die be good for the casino?

3) The number of ounces of coffee drank per week by college students follows a symmetric, bell shaped curve with a mean of 60oz and a standard deviation of 25oz.

    a. According to the empirical rule, 84% of the data will lie below what value?

    b. I drink about 185oz of coffee per week, what percentile would I be in?

    c. How much coffee per week does the person at the 10th percentile drink?

    d. What percentage of students drink between 35oz and 85oz of coffee per week?

    e. What percentage of students drink between 28oz and 185oz of coffee per week?

4) The number of goals scored, per season, by a EPL soccer player is 10 with a standard deviation of 3.

   a. Do out all that empirical rule stuff.
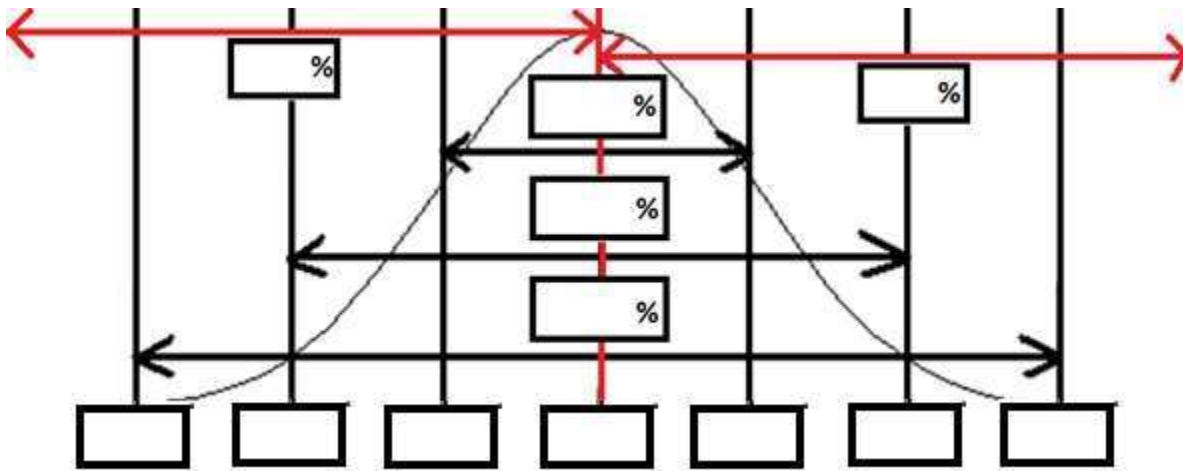
   b. If a player scored 15 goals, what percentile is he in?

   c. How many goals did someone at the 25th percentile score?

   d. What percentage of players scored between 8 and 15 goals?

   e. What percentage of players scored between 5 and 8 goals?

5) Assuming no one misses the exam, there should be forty eight of you taking the test. From past experience I expect about 90% of you to pass. Let X= the number of you that pass.

    a. Find the mean of x, the average number of students that will pass.

    b. Find the standard deviation of x.

    c. What is the probability that exactly forty seven people pass?

    d. What's the probability that all forty eight students pass?

    e. What's the probability more than forty six students pass?

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6) According to teausa.com 65% of the tea brewed in the US were brewed using teabags.

a. What's the probability that a randomly selected tea was brewed using something other than a tea bag?

b. Say we take a random sample of ten teas, what's the probability that all ten of them are brewed using something other than a tea bag?

c. Say we take a random sample of ten teas, what's the probability that all ten of them are brewed using a tea bag?

d. Say we take a random sample of ten teas, what's the probability that five of them are brewed using something other than a tea bag?

e. Say we take a random sample of ten teas, what's the probability that more than five of them are brewed using something other than a tea bag?

7) From past experience, it rains about 10% of the days in Columbia, SC. Let X=it is a sunny day and consider looking at how many days will be sunny in the next two years, 730 days.

    f.   What kind of problem is this? What parameters are defined and what are they defined as?

    g.   Find the mean of x, what does it mean?

    h.   Find the standard deviation of x.

8) Eighty percent of college students have tried an illegal drug: marijuana, prescription drugs, etc. Consider taking a random sample of 100 college students. Can we use the binomial experiment here? If so, find the mean and standard deviation of this distribution.

9) Show that the empirical rule works using the z table.