

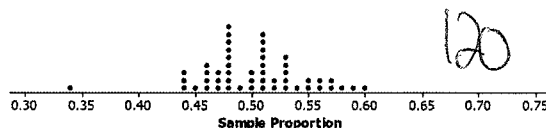
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Date \_\_\_\_\_  
Algebra II

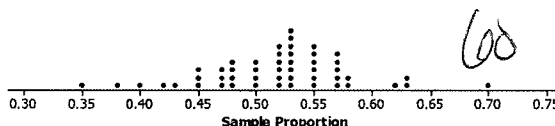
## Sample Distributions and Sample Size

1. Below are three dot plots of the proportion of tails in 20, 60, or 120 simulated flips of a coin. The mean and standard deviation of the sample proportions are also shown for each of the three dot plots. Match each dot plot with the appropriate number of flips. Clearly explain how you matched the plots with the number of simulated flips.

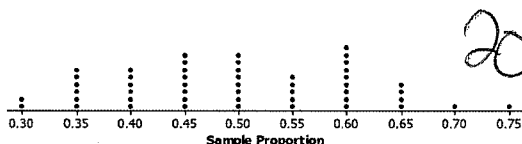
Dot Plot 1:



Dot Plot 2



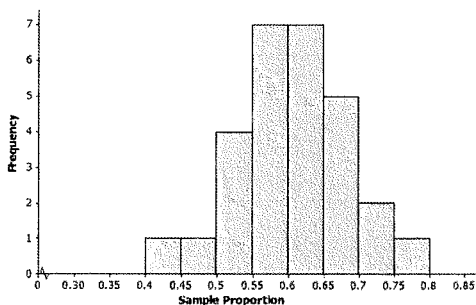
Dot Plot 3



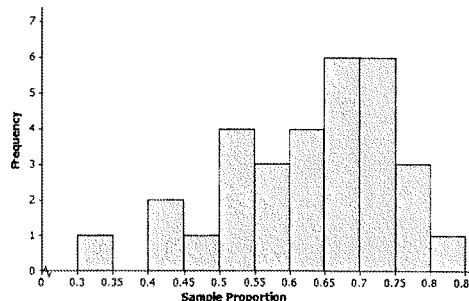
The larger the  
Sample size, the  
smaller the  
standard deviation

2. A group of eleventh graders wanted to estimate the proportion of all students at their high school who suffer from allergies. Each student in one group of eleventh graders took a random sample of 20 students, while each student in another group of eleventh graders each took a random sample of 40 students. Below are the two sampling distributions (shown as histograms) of the sample proportions of high school students who said that they suffer from allergies. Which histogram is based on random samples of size 40? Explain.

Histogram A

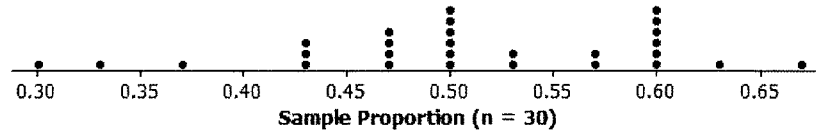


Histogram B



the larger the sample  
size, the smaller the standard  
deviation

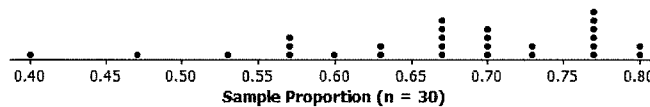
3. A group of eleventh graders wanted to estimate the population proportion of students in their high school who drink at least one soda per day. Each student selected a different random sample of 30 students and calculated the proportion that drink at least one soda per day. The dot plot below shows the sampling distribution. This distribution has a mean of 0.51 and a standard deviation of 0.09.



If, instead of taking random samples of 30 students in the high school, the eleventh graders randomly selected samples of size 60, describe what will happen to the mean and standard deviation of the sampling distribution of the sample proportions.

The mean would relatively stay the same.  
The standard deviation would decrease.

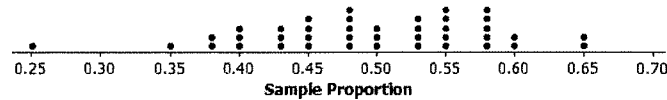
4. A class of 28 eleventh graders wanted to estimate the proportion of all juniors and seniors at their high school with part-time jobs after school. Each eleventh grader took a random sample of 30 juniors and seniors and then calculated the proportion with part-time jobs. A dot plot is created to represent the data. The mean is 0.67 and the standard deviation is 0.1.



Suppose the eleventh graders had taken random samples of size 60. How would the distribution of sample proportions based on samples of size 60 compare to the distribution for samples of size 30?

The mean would relatively stay the same.  
The standard deviation would decrease.

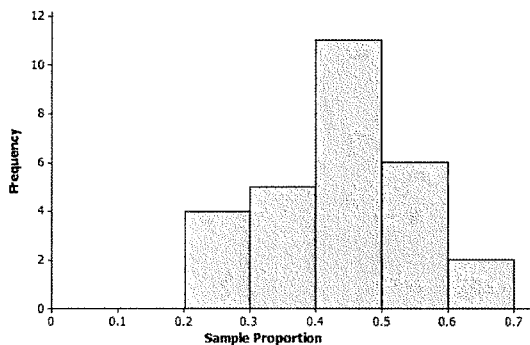
5. The following is an example of a sampling distribution of sample proportions of heads in **40** flips of a coin. The mean is .4955 and the sample standard deviation is .0852.



If this experiment was performed where the coin was flipped 20 times, how would the data be affected?

*The mean would relatively stay the same.  
The standard deviation would increase.*

6. The nurse in your school district would like to study the proportion of all high school students in the district who usually get at least eight hours of sleep on school nights. Suppose each student in your class takes a random sample of 20 high school students in the district and each calculates their sample proportion of students who said that they usually get at least eight hours of sleep on school nights. Below is a histogram of the sampling distribution.



Suppose students had taken random samples of size 60. How would the distribution of sample proportions based on samples of size 60 differ from those of size 20?

*The mean would relatively stay the same. The standard deviation would decrease.*