**8.** The mean of the sample means is $\mu$

**9.** Provided that $n < \frac{1}{10}N$, where $N$ is the size of the population, then the standard deviation of the sample means is $\frac{\sigma}{\sqrt{n}}$.

**10.** The shape of the distribution of the sample means depends on some conditions. If the distribution of the population is normal, or approximately normal, then so will be the sampling distribution. If the population distribution is not normal, then the sampling distribution will only be approximately normal if the sample size is "big enough" according to the Central Limit Theorem.

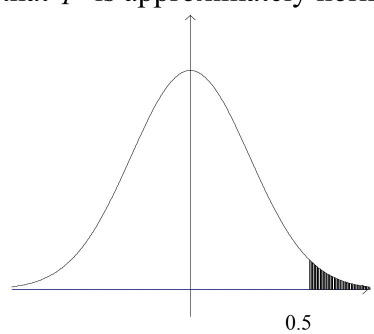
**11.** The mean of the sampling distribution of $\hat{p}$ is 0.45

**12.** Provided that 500 is less than one-tenth of all adults, the standard deviation of $\hat{p}$ is $\sqrt{\frac{0.45(0.55)}{500}} = 0.0222$.

**13.** It is reasonable to assume that that there are more than 500(10) = 5000 adults in the population.

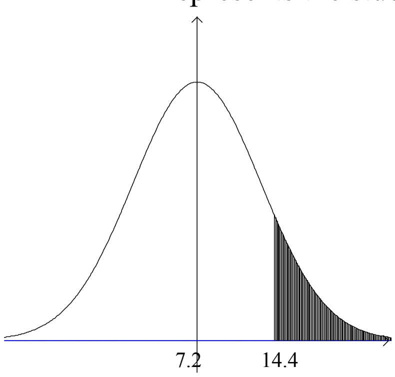
**14.** Since $np = 225 > 10$ and since $nq = 275 > 10$, we can assume that $\hat{p}$ is approximately normally distributed.

**15.** $P(\hat{p} > 0.5) =$ normalcdf(0.5, 1E99, 0.45, 0.0222) = 0.0122




**16.**

If $X$ represents the study time of a college freshmen,




$P(X \geq 2(7.2)) =$ normalcdf(14.4, 1E99, 7.2, 5.3) = 0.087

**17.** Since $X$ is normally distributed, we know that the sampling distribution $\overline{X}$ is too.

**18.** $\mu_{\overline{X}} = \mu_X = 7.2$ hours, and $\sigma_{\overline{X}} = \frac{\sigma_X}{\sqrt{55}} = 0.71465$ hours

**19.** $P(\bar{x} > 14.2) =$ normalcdf(14.2, 1E99, 7.2, 0.71465) = $6.02 \times 10^{-23}$

**20.** The answer to number 16 would be distinctly different. Depending on how non-normal the distribution was, our answer to number 17 would not be too different. 55 is a pretty big sample, so we would expect the distribution of sample means to stay normal by the CLT. Our answer to number 18 does not depend on the distribution of $X$. And by the same reasoning as regarding question 17, our answer to number 19 would not be too different.