Chapter 4 Quiz – Number 6

X=price of gas
The population of X is normal with \( \mu = 2.75 \) and \( \sigma = 0.40 \)

Question: If you take a random sample of 50 gas stations and calculate the sample mean price, what is the probability that the sample mean is between $2.60 and $2.90.

First: Describe the sampling distribution of the mean:

a. \( \mu_X = \mu = 2.75 \)

b. \( \sigma_X = \frac{\sigma}{\sqrt{n}} = \frac{0.40}{\sqrt{50}} = 0.056569 \)

c. The shape of the sampling distribution is normal because the population shape is normal (regardless of sample size)

Second: Given the characteristics of the sampling distribution, shade the area represented by the probability:

Third: Convert the sample means to Z-scores:

\[
Z = \frac{\bar{X} - \mu_X}{\sigma_X} = \frac{2.60 - 2.75}{0.056569} = -2.65
\]

\[
Z = \frac{\bar{X} - \mu_X}{\sigma_X} = \frac{2.90 - 2.75}{0.056569} = +2.65
\]

Third: Convert the sampling distribution to a Z-distribution and use the Z-table to find the probability:

Answer = 0.9920
Chapter 5 Quiz – Number 6

In order to get the p-value for the chi-square test, the user must get the results of the chi-square test of independence on those 2 variables by running the following code (which is identical to the code used in Program 5.2 except the user should replace Corner with Fullbath_2plus):

```sas
libname sasba 'c:\sasba\ames';
  data ames;
  set sasba.ames300;
proc format;
  value Quality 0=No 1=Yes;
  value YesNo 0=No 1=Yes;
proc freq data=ames;
  tables Bonus*fullbath_2plus /chisq relrisk expected plots=freqplot(scale=percent);
  format Bonus fullbath_2plus YesNo.;
  title 'Test of Independence for Bonus and Fullbath_2plus';
run;
```

From the SAS output, the user can see that the chi-square test stat = 150.5152 with p-value which shows up as <.0001. Since the user doesn't have the exact p-value from the output, you can use an excel function, inserting the test stat and degrees of freedom, to get it:

=CHISQ.DIST.RT(150.5152,1) where 1=the degrees of freedom.

As a result, you get an p-value of 1.33767 x 10 to the -34 power.

Finally the WORTH = -2log(1.33767x10 to -34 power) = 67.75 (which is answer A)