

1.  $Z$  has the standard normal distribution. Find the probabilities below, using a calculator, writing down the calculator command line. Draw a **diagram** of the normal curve with appropriate shading in each part and endpoints labeled.
  - (a)  $P( -1.41 \leq z \leq 0 )$  (Draw a graph.)
  - (b)  $P( z \leq 1.41 )$  (Draw a graph.)
  - (c)  $z_0$ , so that  $P( z \geq z_0 ) = 10.6\%$  (Draw a graph.)
  - (d)  $z_0$ , so that  $P( |z| \geq z_0 ) = 10.6\%$  (Draw a graph.)
  
2. Let  $X$  be the number of successes in  $n = 800$  independent trials where the probability of success on each trial is  $p = 0.45$ . Find
  - (a) the **mean** value of  $X$
  - (b) the **standard deviation** of  $X$
  - (c)  $P( 350 \leq X \leq 367 )$  by using the **normal approximation** to the binomial.
  - (d)  $P( 350 \leq X \leq 367 )$  by using the **binomial functions** on the TI.
  
3. The heights of 240 trees in a sample are measured. If the **population mean** is 2.65 m with a **population standard deviation** of 0.60 m, find the probability that the **sample mean** is **less than 2.61 m**.
  
4. In a random sample of 80 cars, 12 have a satellite radio receiver. Find the 99% confidence interval for the percentage of cars with such a receiver. Include the calculation of the margin of error.
  
5. If the **sample mean** is 38 for a sample of size 130, and the population standard deviation is 6.35, find the 96% **confidence interval** for the population mean. Give the endpoints accurate to six or more decimal places. Include the calculation of the margin of error.

GO TO PAGE 2.

6. Using a sample of size  $n$ , the endpoints of a confidence interval for the population mean are given by  $\bar{x} \pm 1.5141(\sigma/\sqrt{n})$ .
- (a) What is the value of  $\alpha$ ? (Can round to three decimal places.)
  - (b) What is the **confidence level**?
  - (c) If  $\sigma$  is 8.0, find the **minimum sample size** so that the margin of error,  $E$ , is under 0.55 in size.
7. If the **sample mean** is 45, for a sample of size 15, and the **sample** standard deviation is 3.9, find the **93% confidence interval** for the population mean.  
(The population is normally distributed. Show calculation of maximum error.)
8. The maximum error of the estimate is to be 0.07 in a 90% confidence interval for the proportion. What should the **minimum sample size** be? (Assume we cannot estimate  $p$  and  $q$ .)
9. The weights of 33 loaves of bread are measured. The **sample standard deviation** is 0.85 ounces. Find the **94%** confidence interval for the population variance, including the calculation of the critical values.

( 100 points, total. )