Two proportions Z test on Graphing Calculators

Question 1 using TI 83. The TI84 menu is identical to the TI83.

1. Assume that you plan to use a significance level of $\alpha = 0.05$ to test the claim that $p_1 = p_2$. Use the given sample sizes and numbers of successes to find the P-value for the hypothesis test.

   - $n_1 = 100$  
   - $n_2 = 100$  
   - $x_1 = 38$  
   - $x_2 = 40$

   Claim $P_1 = P_2$  
   $H_0: P_1 = P_2$  
   $H_1: P_1 \neq P_2$

   Test Statistics, $z = -0.29$  
   $p$-value $= 0.7719$

   Conclusions: $p$-value $> \alpha$ (significance level); therefore, we fail to reject the Null Hypothesis. There is no sufficient evidence to warrant rejection of the claim that the two proportions are equal.
Question 2 Using Casio 9750:

2. Use the traditional method to test the given hypothesis. Assume that the samples are independent and that they have been randomly selected.
Use the given sample data to test the claim that $p_1 > p_2$. Use a significance level of 0.01.
Sample 1 Sample 2
$n_1 = 85 \quad n_2 = 90$
$x_1 = 38 \quad x_2 = 23$

Test Stat, $z = 2.66 \quad p$-value = 0.0039

Conclusions: $p$-value < alpha (significance level); therefore, we reject the Null Hypothesis. There is sufficient evidence to support the claim that $P_1$ is greater than $P_2$.

Question 5: A 90% Confidence interval of the difference between two proportions:

Construct the indicated confidence interval for the difference between population proportions $p_1 - p_2$. Assume that the samples are independent and that they have been randomly selected.

$x_1 = 19, n_1 = 46 \quad x_2 = 25, n_2 = 57$; Construct a 90% confidence interval for the difference between population proportions $p_1 - p_2$.

Answer on TI 83 [same as TI 84]
Interpretation: The confidence interval allows to draw a conclusion about whether there is a difference between the two populations proportions. There are three cases:

a. Both sides of the Confidence interval are positives: It implies that \( P_1 > P_2 \).
b. Both sides of the Confidence interval are negatives: It implies that \( P_1 < P_2 \).
c. Left side is negative and right side is positive. It is said that the interval contains zero; that is, that the difference of proportions includes the value zero, which implies that there is no difference between the two population proportions.

In Question 5 the interval:

90 percent confidence interval:

\(-0.186633 \quad 0.135527\)

Conclusions: The 90% interval \(-0.186633 < p_1-p_2 < 0.124527\) suggests that there is no significant difference between the two populations proportions.