MTH 245, Quiz #9, Spring 2022 Name KEY

Instructions: Show all work (that work can be in the form of a spreadsheet submitted along with the quiz or done by hand on paper; if you use your calculator, say what functions you used). Report answers to the standard number of decimal places, or to the number requested in the problem. Be sure to answer all parts of the questions, including requests for interpretation and explanations. Be as thorough as possible.

1. 1500 Americans were asked if they thought the country was headed in the right direction and 45% of respondents in that poll responded "yes". We'd like to test if this is good evidence that fewer than half of all Americans think that the country is headed in the right direction.
   a. State the null and alternative hypotheses in correct notation.

$H_0: p = 0.5$
$H_a: p < 0.5$

   b. What is a Type I error in the context of this problem?

there are more people who think the economy is doing well, but we incorrectly believe fewer people do.

   c. What is a Type II error in the context of this problem?

there are fewer people (than half) that believe the economy is doing well, but we incorrectly think half or more think its doing okay.

   d. Conduct the hypothesis test to see if this is good evidence that fewer than half of all Americans think that the country is headed in the right direction.

p-value : $= 5.376 \times 10^{-5} << 0.05$ $z = -3.87298$

reject the null hypothesis
fewer than 50% of americans think the economy is doing well

2. A sample of 51 adults were sampled and spend a mean of 45.6 hours per week working. If the standard deviation of the sample was 5.3 hours, is this good evidence to think that most working adults work more than 40 hours per week?

$H_0: \mu = 40$
$H_a: \mu > 40$

$t = 7.54566$

p-value $= 4.218 \times 10^{-10} << 0.05$
reject null
this is good evidence the mean hours worked is more than 40