Problem 1 (32 points)

Researchers at Wolfson Children's Hospital, Jacksonville, FL tested a new technology meant to reduce the number of attempts needed to draw blood from children. They collected data on the number of successes on the first attempt using the new technology and on a historical comparison group using standard technology. This data is summarized in the following table:

	Standard Technology	New Technology
Successful on 1st	74	73
Unsuccessful on 1st	76	18
Total	150	91

Please use a significant level of 0.05 for your tests. For (2), please perform the t-test with the equal variance assumption.

(1) (**11 points**) Is there evidence that the new technology changes the probability of success on the first attempt? Please specify 5 steps of hypothesis testing with the p-value approach.

(2) (**5 points**) Construct the two-side confidence interval of the difference of the probability of success on the first attempt between the standard technology and the new technology. Please provide sufficient details about your calculations here.

(3) (**5 points**) Use R function `prop.test()` to test if the new technology improves the probability of success on the first attempt. You only need to report the chi-square statistic, the p-value, and the confidence interval and state your conclusion in your solution file.

(4) (**8 points**) The researchers also recorded the ages of children. In the standard technology group, the 150 children had a mean age of 5.73 and a standard deviation of 6.15. In the new technology group, the mean age was 9.02 with a standard deviation of 6.10. Does the mean age of the children in the two groups differ significantly? Just provide the calculation of test statistics and the p-value with sufficient details and state your conclusion.

(5) (**3 points**) How do the results of part (2) complicate the interpretation of part (1)?