STA 130: Exercise about Comparing Polls

An article[1] in the Toronto Star on February 23, 2016 is headlined "Union-Pearson train's over-priced image was growing". The article cites two different polls conducted by Forum Research:

Poll #1: An August 4, 2015 poll[2] of 892 randomly selected voters in Toronto, which found that 68% of them said the Union-Pearson Airport Express (UPX) was too expensive.

Poll #2: A February 23, 2016 poll[3] of 836 randomly selected voters in Toronto, which found that 79% of them said the Union-Pearson Airport Express (UPX) was too expensive.

In terms of these two polls, consider the following questions:

1. What is the general formula (from class) for the usual 95% margin of error for a poll with sample size n? (Remember both the bold and the conservative options.)

2. Using the above formulas, what are the margins of error for Poll #1, and for Poll #2?

3. Based on the above, what are the 95% confidence intervals for the true percentage of Toronto voters who thought the UPX was too expensive on the two different dates?

4. What are the mean and variance for the <u>difference</u> between the observed fraction of Toronto voters who thought the UPX was too expensive on the later date, <u>minus</u> the observed fraction on the earlier date?

5. Based on the above, what is a 95% confidence interval for the difference between the observed fraction of Toronto voters who thought the UPX was too expensive on the later date, <u>minus</u> the observed fraction on the earlier date?

6. What is the P-value for the null hypothesis that the <u>true</u> fraction of Toronto voters who thought the UPX was too expensive was the same on both dates, versus the alternative hypothesis that it was different? (Hint: You may wish to use a <u>standard normal probability table</u>, which you can borrow if necessary.)

7. Based on your answers to the above questions, to what extent can or can't we conclude that more Toronto voters thought the UPX was too expensive on the later date than on the former date?

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[1] http://www.thestar.com/news/gta/transportation/2016/02/23/union-pearson-trains-over-priced-image-was-growing-forum-poll.html

[2] http://poll.forumresearch.com/post/339/incorporate-upx-into-ttc-at-lower-fare-majority/

[3] http://poll.forumresearch.com/post/2467/more-now-see-it-as-too-costly-fewer-intend-to-use