Statistics for Social Sciences I

Test II (A)

Student: _____

Group: _____ **Date:** _____

Exercise 1. The following table shows the results of the latest *YouGov* Brexit poll carried out using a survey of 1650 British adults on 25th-26th April 2016, just after the intervention of President Obama to support the Remain (in Europe) campaign.

Note that the total numbers of respondents in each category are the **Weighted Samples**. Observe also that the data in the lower part of the table are percentages and that each column sums to 100%.

Fieldwork: 25th - 26th April 2016

			Headline Voting Intention					Vote in 2015				Gender		Age				Social Grade		Region					EU Referendum Voting Intention			
		Total	Con	Lab	Lib Dem	UKIP	Other	Con	Lab	Lib Dem	UKIP	Male	Female	18-24	25-49	50-64	65+	ABC1	C2DE	London	Rest of South	Midlands / Wales	North	Scotland	Remain	Leave	Don't know	SWING VOTERS
Weighted Sample		1650	352	407	76	246	137	465	386	99	158	799	851	191	706	406	347	940	710	198	548	355	398	152	672	697	220	660
Unweighted Sample		1650	374	430	82	244	140	493	421	116	166	685	965	160	666	451	373	1061	589	184	553	345	419	149	711	688	211	620
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	12-14 April	**25-26 April**																										
If there was a referendum on Britain's membership of the European Union and this was the question, how would you vote:																												
Should the United Kingdom remain a member of the European Union or leave the European Union?																												
Remain a member of the European Union	*40*	**41**	40	70	61	1	65	32	60	60	1	42	40	53	44	38	29	51	27	50	36	36	39	59	100	0	0	28
Leave the European Union	*39*	**42**	48	21	22	96	29	52	25	25	95	45	40	27	35	48	59	36	51	35	44	48	43	32	0	100	0	32
Would not vote	*5*	**4**	0	1	0	0	0	0	1	1	1	4	4	5	5	3	1	2	6	2	5	5	3	1	0	0	0	8
Don't know	*16*	**13**	12	8	18	3	6	15	14	14	4	10	16	15	16	11	11	11	16	13	15	12	15	8	0	0	100	32

(a) If a survey respondent is chosen at random, what is the probability that they voted Conservative in the last (2015) elections? (1 point)

(b) Given that they voted Conservative in the last elections, what is the probability that they want to leave the EU? (1 point)

(c) Assuming they want to leave the EU, what is the probability that they voted Conservative in the last elections (1 point)

(d) Is there any evidence from this data that there is a statistical dependence between the variables “opinion on whether or not the UK should remain in the EU” and “party voted for in the 2015 elections”. Discuss briefly but do not perform a formal test. (1 point)

Exercise 2. USA Today reported the results of a survey carried out by Suffolk University on who Republicans want to be their candidate at the next presidential elections. The results are reported in the table below.

21. If the *Republican* Primary for President of the United States were held today, and the candidates were (RANDOMIZE) Ted Cruz, John Kasich, or Donald Trump, for whom would/did you vote?

	%
Ted Cruz	29.11
John Kasich	16.78
Donald Trump	45.21
Other	1.03
Undecided	7.88

Assuming that these results are typical of US Republicans:

(a) What is the probability that three Republicans all support Trump? (1 point)

(b) What is the probability that two vote for Trump and one votes for Ted Cruz? (1 point)

(c) What are we assuming in the parts (a) and (b)? Do the assumptions seem reasonable? (1 point)

Exercise 3. The International Business Times of 28th April 2016 released the following article on the results of the same YouGov poll.

EU referendum: Barack Obama's Brexit plea failed as 'leave' takes opinion poll lead

Barack Obama's pro-remain intervention in the EU referendum campaign failed to convince the UK electorate to oppose a Brexit. A 'leave' vote has now taken the lead in the opinion polls with 42%, while 'remain' is just behind on 41%.

The YouGov poll for The Times, conducted between 25 and 26 April, also showed that the number of people opting for a breakaway from Brussels had jumped by three points. Support for staying in the 28-nation-bloc had increased by just one point.

The study comes a week after the president warned that the UK would be at the "back of the queue" for a trade agreement with the US after a Brexit. "Maybe some point down the line there might be a UK/US trade agreement, but it's not going to happen any time soon because our focus is on negotiating with a big bloc, the EU, to get a trade agreement," Obama added.

The intervention did shift the betting marketing, withWilliam Hill and Ladbrokes "drastically" shortening their odds for a 'remain' vote on the 23 June, but the YouGov poll suggests Obama failed to capture the British public's imagination. The findings are a blow to the pro-EU campaign and David Cameron, who is campaigning for a 'remain' vote at the referendum.

(a) Calculate a 95% confidence interval for the true proportion of UK voters who want to leave the EU. Comment on the results with respect to the headline of the article. (1.5 points)

(b) In the previous YouGov poll of 12th-14th April, the proportion of voters in favour of leaving the EU was estimated as 39%. Is there any evidence from the new survey that this has increased now? Carry out a hypothesis test at a 5% significance level (1.5 points)

ANNEX 1

Excel screen shots: