Question #1a

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.02</td>
<td>(0.00) ***</td>
</tr>
<tr>
<td>Education</td>
<td>0.26</td>
<td>(0.04) ***</td>
</tr>
<tr>
<td>Strong Partisan (1=Yes)</td>
<td>1.60</td>
<td>(0.18) ***</td>
</tr>
<tr>
<td>Married (1=Yes)</td>
<td>0.43</td>
<td>(0.13) ***</td>
</tr>
<tr>
<td>White (1=Yes)</td>
<td>-0.15</td>
<td>(0.15)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.91</td>
<td>(0.27) **</td>
</tr>
</tbody>
</table>

N 1749  
Pseudo R-squared 0.11

Dependent variable: Respondent cares about the election

Question #1b

Based on descriptive statistics, we know that: the average age is 47.2. The average education level is 4.29. The probability of being married is 52.1%. The probability of being non-white is 23% (100-probability of being white=100-77.0=23.0%). The probability of being a strong partisan is 32.8%.

Thus, if we put all these numbers into an equation for predicted probabilities, we get:

Predicted Probability = \( \frac{1}{1 + e^{-(-0.91 + 0.02(\text{age}) + 0.26(\text{education}) + 1.60(\text{strong partisan}) + 0.43(\text{married}) - 0.15(\text{white})}}} \)

Predicted Probability = \( \frac{1}{1 + e^{-(-0.91 + 0.02(47.2) + 0.26(4.29) + 1.60(0) + 0.43(1) - 0.15(1))}} \)

When we calculate it out, the probability that an average person will care about the election is 77.26%. Using the prvalue command confirms this result.

Question #1c, d, e

Age has a positive relationship to caring about the election. In other words, as the person gets older, they are more likely to care about the election. Someone who is 18 has a 68.4% probability of caring about the election. Someone who is 95 (the maximum age in the dataset) has an 87.6% probability of caring.

Question #1f, g, h

Education has a positive effect on caring about the election. The better educated a person is, the more likely they are to care about the election. The education variable in this dataset is coded such that it ranges from 1 to 7, with higher numbers indicating more education. Someone who is at “1” (or less than an 8th grade education) has a 58.9% probability of caring about the election. Someone who is at “7” (or an advanced educational degree) has a 87.3% probability of caring about the election. That is a 29% difference.

Question #2 a, b, c, d

Answers will vary based on the random sample that you select. One set of responses is given below.
The mean of all the respondents in anes2000.dta is 2.81. The difference between the “true” mean and the sample means is indicated in the last row of the table above.

**Question #3, a, b**
The mean is 2.81 and the standard deviation is 1.46. The 95% confidence interval is:

\[
\text{Mean} \pm (1.96 \times \text{s.d.}) = 2.81 \pm (1.96 \times 1.46) = (-0.052, 5.666)
\]

This means that 95% of the time, the true mean of respondents’ approval of Congress will lie somewhere between -0.052 (or, effectively zero) and 5.666.

**Question #3 c, d, e**
If we recode partyid7 into a dummy variable for Democrats, we find that there are 863 Democrats and 678 Republicans. The t-test examines whether people’s approval of Congress varies by party identification. The results are below:

```
ttest v000358, by(pid2)
```

<table>
<thead>
<tr>
<th>Group</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>601</td>
<td>2.615641</td>
<td>.0575959</td>
<td>1.41198</td>
<td>2.502527 2.728755</td>
</tr>
<tr>
<td>1</td>
<td>748</td>
<td>2.942513</td>
<td>.0545145</td>
<td>1.490949</td>
<td>2.835494 3.049533</td>
</tr>
<tr>
<td>combined</td>
<td>1349</td>
<td>2.796887</td>
<td>.0398818</td>
<td>1.464806</td>
<td>2.71865 2.875124</td>
</tr>
<tr>
<td>diff</td>
<td>- .3268728</td>
<td>.0797755</td>
<td>.4833705</td>
<td>.170375</td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{diff} = \text{mean}(0) - \text{mean}(1) \quad t = -4.0974
\]

The t-test examines whether the difference between the mean approval for Congress among Republicans and Democrats is statistically different. The null hypothesis is that it is zero, or that they are equal. We find, however, that the alternative hypothesis is true. Congressional approval rating is coded negatively, from approve to disapprove, so a higher average indicates lower approval ratings. Because the t-test is set
up such that the difference is Republicans – Democrats, negative numbers indicate that Democrats have a higher approval rating of Congress than Republicans. We find that there is a statistically significant difference and that Republicans are likely to have a higher approval rating of Congress than Republicans. This is unsurprising since the Republicans controlled both houses of Congress in 1999-2000.

**Question #4**
There were a range of potential answers to question #4. Below are answers from a previous student in the class, Lucy Lee. Her answers were very complete and well-done.

**Question 4, part a:**
My null hypothesis is that the relationship between term limits and percentage of women in the state legislature is negative, or zero. My alternative hypothesis is that the relationship between term limits and percentage of women in the state legislature is positive. In other words, the percentage of women in the state legislature will increase with the presence of term limits. I made this alternative hypothesis because I’m guessing that the majority of state legislators are male. If there are no term limits, then these male legislators get to stay in office longer, since they’ll be incumbents and incumbents are more likely to be re-elected. However, if there are term limits present, then this will force the incumbents (who are mostly male) out of office, and then this will give new women candidates more opportunities to run for office. Eventually this will cause an increase in the percentage of women in the state legislature.

**Question 4, part b:**
As the term limits go from 0 to 1, or as you move from not having any term limits to having term limits, there is a 4.042 unit increase in the percentage of women in the state legislature. So as a state adopts term limits, the percentage of women in the state legislature goes up by 4.0%.

**Question 4, part c:**
My hypothesis in part (a) was correct. I can say this because the term limits coefficient was positive, which means that as the term limits go from 0 to 1, the percentage of women in the state legislature goes up, not down. I know that the relationship between term limits and percentage of women is not simply due to chance, because the p value for term limits is 0.000. This means that the probability that the null hypothesis is true is close to zero.

**Question 4, part d:**
As the total number of seats in the state legislature goes up by one unit, the percentage of women in the state legislature goes down by 0.009%.

\[
\text{Percent of women} = 22.459 + -0.009(\text{# of seats}) + 0.003(\text{salary}) + 4.042(\text{term limits})
\]
\[
= 22.459 + -0.009(25) + \text{salary and term limits effect}
\]
\[
= 22.234 + \text{salary and term limits effect}
\]
\[
\text{Percent of women} = 22.459 + -0.009(\text{# of seats}) + 0.003(\text{salary}) + 4.042(\text{term limits})
\]
\[
= 22.459 - 0.009(100) + \text{salary and term limits effect}
\]
\[
= 21.559 + \text{salary and term limits effect}
\]
So the difference in the percentage of women between a state that has 25 seats versus a state that has 100 seats is 0.675.

**Question 4, part e:**
This model doesn’t explain variation in the percentage of women in the state legislature that well. The adjusted R squared for this model is only 0.13, which means that this model explains only 13% of the variation. Maybe this model would explain more of the variation if there were more IV’s added that have an effect on the number of women in the legislature.
Question 4, part f:
In this question, there is a range of different ways to write up your answers. Here are two good examples, from previous students Jennifer Macarchuk and Kate Thompson, respectively.

Jennifer Macarchuk:
This study evaluates the hypothesis that if there are term limits, there will be a higher percentage of women in the state legislature. One reason for this might be that if state legislatures are predominantly male and incumbents have an advantage over other candidates, then it is likely that the state legislature will continue to have a high percentage of males because male incumbents are more likely be elected. When there are term limits, incumbents will be forced out of office eventually, allowing new legislatures to be elected without having to compete against a candidate that has the advantage of being an incumbent. This would allow women to obtain seats in a predominantly male legislature more easily. In states with term limits, we would expect to see a higher percentage of women in the state legislature. In order to evaluate the effect of term limits, the study looks at whether a state has term limits and controls for the number of seats in the state legislature and the legislature salary.

As predicted, the relationship between term limits and the percentage of women in the state legislature is positive and highly significant (p < 0.01). Holding all other independent variables constant, as a state adopts term limits, the percentage of women in the state legislature is predicted to increase by 4.042. Term limits are highly significant; the p-value is 0.000, which is less than 0.01. The hypothesis that term limits increase the percentage of women in the state legislature is correct, because there is less than 1% chance that the null hypothesis (that there is no effect) is true. Also, the impact of the number of seats in the state legislature and the legislature salary, while being highly statistically significant (p < 0.01), have minimal impact on the actual percentage of women in the legislature. For example, holding all other variables constant, as the total number of seats in the state legislature increases by one unit, the percentage of women in the legislature is predicted to decrease only by 0.009. The difference in the percentage of women in the state legislature in a state with 25 legislative seats versus a state with 100 legislative seats is 0.675; holding all other variables constant, states with 100 legislative seats are predicted to only have 0.675 percent less women than legislatures with 25 seats. Holding the number of seats and salary constant, a legislature with term limits is predicted to have 4.042 percent more women than a legislature without term limits. It is clear that term limits have a greater impact on the percentage of women in the state legislature, compared to such factors as salary and number of seats in the state legislature. This model has an Adjusted-R square of 0.13, indicating that it explains 13 percent of the variation in the percentage of women in the state legislature. While this explains some of the variation, considering the minimal effect of the number of seats in the state legislature in salary, it might be useful to control for other factors that might have a more significant impact and explain more variation in the percentage of women in state legislatures. Regardless of this, it is clear that term limits have a highly significant impact on the percentage of women in the state legislature.

Kate Thompson:
The percentage of women serving in state legislatures varies based on many different conditions. Using the 50 state legislatures in the United States, we can see that all three of our variables yield results that are statistically significant: the total number of seats in the state legislature, the legislature salary, and the existence of term limits. We can predict that a legislature with term limits has approximately 4% more women serving than those without, presumably due to the fact
that those representatives who were elected by previous generations (and who are overwhelmingly male) are no longer eligible to run for their seat. Looking at the data for the legislature salary, we can see that there is a positive relationship between the salary in the legislature and the percentage of women serving; that is to say, with every increase in the salary by $1, the percentage of women in the legislature is predicted to rise by 0.003. This may be due to the fact that states where the legislatures have a higher salary are those states with more affluent populations and where higher education is more available, who might be more likely to vote for women. The number of seats in the legislature has a negative effect on the percentage of women serving; with every increase of 1 seat, the percentage of women decreases by 0.009%. This is most likely caused by the underlying belief held by many that the number of women in a legislature matters, and not the percentage, which can translate to smaller percentages in larger legislatures. These three variables account for approximately thirteen percent of the variation that we see in the percentage of women serving in state legislatures.