4.7: $CI = 0.45 \pm (1.96)(0.012) = (0.426, 0.474)$
We are 95% confident the true population proportion is between 42.6% and 47.4%.

4.8: We need to determine $z^\star$ such that $P(|Z| \leq z^\star) = 0.99$. We draw a sketch of a centrally symmetric area of 0.99, leaving two tails, each with 0.005 area. We can use the z table in reverse to find $z^\star$ such that $P(Z < z^\star) = 0.995$. We determine that $z^\star = 2.58$.

$$CI = 0.52 \pm (2.58)(0.024) = (0.458, 0.582)$$

We are 99% confident that the true population proportion is between 0.458 and 0.582.

4.9: **(a):** False, we only have some level of confidence.

(b): True, this is was a condidence interval is.

(c): True, the entire confidence interval is below 50%.

(d): False. This is not what standard error is. Standard error is the standard deviation of a sampling distribution. The standard error comes from the random samples being different, not from the individuals.

4.10: **(a):** False. The confidence interval straddles the 50% mark.

(b): False. If the poll reached 97.6% of users, the standard error would be tiny (of course we are not sure how to deal with this situation exactly because it would mean sampling more than 10% of the population). Standard error comes from differences between random samples. It does decrease with larger sample sizes, but it is often not even a percentage...

(c): False. A higher sample size gives a smaller standard error.

(d): False. A higher confidence level has a wider confidence interval.

4.11: **(a):** We are 95% confident that the true population mean is between 1.38 and 1.92 hours.

(b): The confidence level is higher.

(c): Larger sample size leads to smaller margin of error.

4.12: **(a):** .

4.13: **(a):** .