Show all work. Shade and label the normal curve for each problem.

1. Calculate $P(-1.91 < z < -1.08)$.   **11.2%**
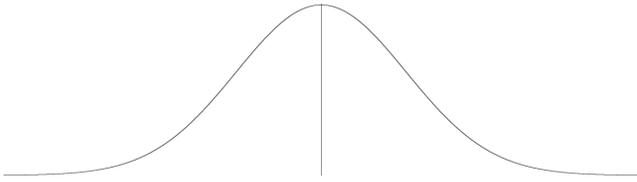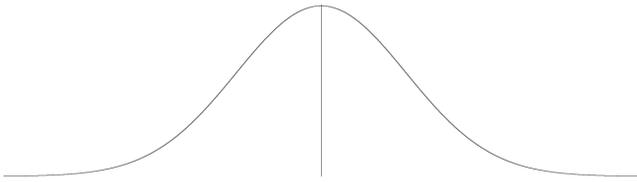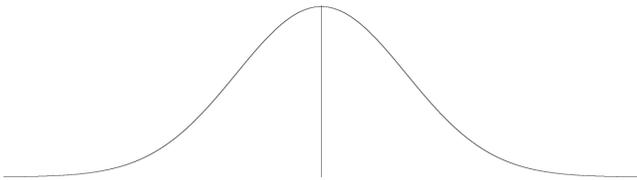
2. How many people should be surveyed to achieve a margin of error of 6% in an 80% confidence interval?
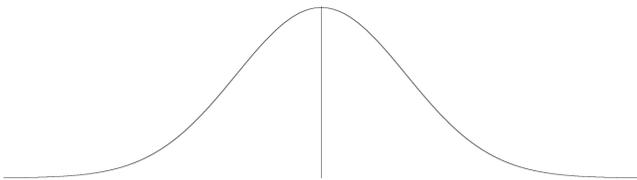
114

3. What score is at the 30th percentile on a test with normally distributed scores averaging 840 and with standard deviation 220?   **725**

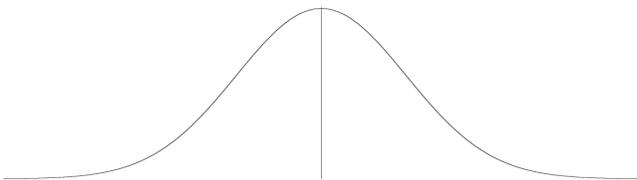4. In a sample of 14 adults, the average distance driven last year was 13,628 miles, with standard deviation 2,688 miles. Give a 95% confidence interval for μ.   **$12076 < \mu < 15180$**

5. Given Ghassemi grapefruit have a mean weight of 620 grams with standard deviation 110 grams, what is the probability that in a bag of 40 the mean weight will be under 600 grams?   **12.5%**

Circle whether each statement is true or false.

T F   1. $P(z > 1.25) = 1 - .8944$

T F   2. $20 < \hat{p} < 36$ is not an appropriate confidence interval.

T F   3. Given $\mu = 40$, $P(\bar{x} > 33)$ is greater if $n = 15$ than if $n = 10$.

T F   4. The critical values for an 86% confidence interval are ± 1.08.

T F   5. The margin of error in the confidence interval $70 < \mu < 82$ is 12.

T F   6. The t distribution is similar to the z distribution but slightly wider.

T F   7. A raw score 2 standard deviations below the mean has a z score of 2.

T F   8. When a poll reports of margin of error, it is for a 90% confidence interval.

T F   9. The z score for the 30th percentile can be found by locating .30 inside the z chart.

T F   10. Most but not all of the area under the normal curve lies between $z = -3$ and $z = 3$.

T F   11. The margin of error in a 95% confidence interval for a proportion is approximately $1/\sqrt{n}$.

T F   12. The distribution of weights of cases of water is more normal than the distribution of weights of individual water bottles.

Circle whether each statement is true or false.

T F   1. If $t(16) = 1.55$ in a right-tailed test, then $p > .05$.

T F   2. If $p < .05$, then the alternate hypothesis is correct.

T F   3. A type II error is rejecting the null when it is actually true.

T F   4. The probability of a type I error given the null is rejected is .05.

T F   5. A higher standard deviation results in a test having greater power.

T F   6. If $p = .04$, the null hypothesis should be rejected but there is a 4% chance of a type I error.

T F   7. A type I error cannot be made if the null is false, and a type II error cannot be made if the null is true.

T F   8. Type I errors are more likely in between-participants designs than within-participants designs and in two-tailed tests than in one-tailed tests.

T F   9. Given a sample of 40 wolves, the power of a test to reject the null hypothesis that wolves weigh no more than 100 grams on average is approximately 100%.

T F   10. If Jake hypothesizes that children eat more sugar than adults but his sample means turn out about equal, he will conclude that children do not eat more sugar than adults.

T F   11. If Jenny calculates $p = .01$ in a test of two means to see if students in advanced math classes have more musical ability than other students, she should conclude that math increases musical ability.

T F   12. Testing the short-term effects of caffeine could easily be done with either a between-participants design or a within-participants design, but testing the long-term effects of caffeine would be much easier with a between-participants design.

Circle whether each statement is true or false.

T F   1. In an ANOVA, $F = (SS_W / df_W) \div (SS_B / df_B)$.

T F   2. $F = -1.45$, $\chi^2 = -6.41$, $r = 2.07$, and $p = 3.39$ are all impossible.

T F   3. A χ^2 test of independence with 90 participants has 89 degrees of freedom.

T F   4. The null hypothesis for an ANOVA is that the sample means are not all equal.

T F   5. Extrapolation is making a prediction about an x value that his higher or lower than all of the x values in the data set.

T F   6. In a χ^2 goodness of fit test to see if a distribution is not normal, E for $\mu < x < \mu + \sigma$ is 34% of n.

T F   7. An r test of a correlation would be used to test the relationship between hair color and eye color.

T F   8. Every point on a line of best fit represents a given x value and its corresponding predicted y value.

T F   9. In a two-tailed test of a single variance with $n = 22$, a result of $\chi^2 = 3.12$ will result in not rejecting the null hypothesis.

T F   10. Given 20 out of 30 girls and 12 out of 23 boys were dressed up, the expected number of girls who dressed up would be $^{32}/_{53}$ of 30.

T F   11. $r = .80$ is a reasonable estimate for the correlation coefficient relating number of cigarettes smoked per day and expected life span.

T F   12. If Molly compares the average amount of fruit produced by each of four different varieties of peach trees, with a total of 45 fruit trees in her samples, her critical value is $F_0 = 3.18$.

Do the following for two of the following hypotheses. Each one must be done by at least two people.
a) State a sample that would be appropriate to test the hypothesis. The sample size can be small.
b) Make up a reasonable data set for this sample, using different data than everyone else. Clearly specify your units.
c) Identify the statistical test you will use.
d) Carry out the statistical test.
e) State the conclusion, followed by the calculated statistic and a *p* value range.
f) Sketch a carefully labeled graph showing the results.

1. Are nations' literacy rates and poverty rates related?

2. Does the number of texts sent per day vary by race?

3. Do high school students with jobs have lower GPA's than those without jobs?

4. Can weightlifters curl more with the hand they write with than with their other hand?

5. Are high school students with GPA's over 4.0 more likely to go to grad school than other students?