1. A study with 36 observations had a mean of 70. Assume that the standard deviation is 12. Make a diagram that illustrates the effect of the confidence level on the width of the interval. Use 80%, 90%, 95% and 99%. Summarize what the diagram shows.
2. Computers in some vehicles calculate various quantities related to performance. One of these is the fuel efficiency, or gas mileage, usually expressed as miles per gallon (mpg). For one vehicle equipped in this way, the mpg was recorded each time the gas tank was filled, and the computer was then reset. Here are the mpg values for a random sample of 20 of these records:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 41.5 | 50.7 | 36.6 | 37.3 | 34.2 | 45 | 48 | 43.2 | 47.7 | 42.2 |
| 43.2 | 44.6 | 48.4 | 46.4 | 46.8 | 39.2 | 37.3 | 43.5 | 44.3 | 43.3 |

Suppose that the standard deviation is known to be σ = 3.5 mpg.

a). What is σ, the standard deviation of .

b). Give a 95% confidence interval for µ, the mean mpg for this vehicle.

3. The one-sample t statistic for testing

 **H0: µ= 20**

 **Ha: µ < 20**

**based on n = 115 observations has the value t = -1.55.**

a). What are the degrees of freedom for this statistic?

b). Between what two values does the P-value of the test fall?

c). If you have software available, find the exact P-value?