## Answer on Question #44300 – Math - Statistics and Probability

### ***Task:***

From a sample of 10 squirrels the average weight was 511 grams with standard deviation of 160 grams.

What is the t value for a 95% confidence interval?
What are the lower and upper limits of the 95% confidence interval?

### ***Solution:***

The confidence interval is:

$$\bar{x} - t\frac{\delta}{\sqrt{n}} < a < \bar{x} + t\frac{\delta}{\sqrt{n}}$$

where $\bar{x} = 511, \delta = 160, n = 10.$ $\Phi(t)$ – Laplace function

| $x$ | $\Phi(x)$ | $x$ | $\Phi(x)$ | $x$ | $\Phi(x)$ | $x$ | $\Phi(x)$ |
|---|---|---|---|---|---|---|---|
| 1,26 | 0,3962 | 1,59 | 0,4441 | 1,92 | 0,4726 | 2,50 | 0,4938 |
| 1,27 | 0,3980 | 1,60 | 0,4452 | 1,93 | 0,4732 | 2,52 | 0,4941 |
| 1,28 | 0,3997 | 1,61 | 0,4463 | 1,94 | 0.4738 | 2,54 | 0,4945 |
| 1,29 | 0,4015 | 1,62 | 0,4474 | 1,95 | 0,4744 | 2,56 | 0,4948 |
| 1,30 | 0,4032 | 1,63 | 0,4484 | 1,96 | 0,4750 | 2,58 | 0,4951 |
| 1,31 | 0,4049 | 1,64 | 0,4495 | 1,97 | 0,4756 | 2,60 | 0,4953 |
| 1,32 | 0,4066 | 1,65 | 0,4505 | 1,98 | 0,4761 | 2,62 | 0,4956 |
| 1,33 | 0,4082 | 1,66 | 0,4515 | 1,99 | 0,4767 | 2,64 | 0,4959 |
| 1,34 | 0,4099 | 1,67 | 0,4525 | 2,00 | 0,4772 | 2,66 | 0,4961 |
| 1,35 | 0,4115 | 1,68 | 0,4535 | 2,02 | 0,4783 | 2,68 | 0,4963 |

P = 0,95 = $2\Phi(t)$; $\Phi(t) = \frac{0,95}{2} = 0,475.$ From the table we can see that t = 1,96.

Now we can use the formula:

$$511 - 1,96\frac{160}{\sqrt{10}} < \alpha < 511 + 1,96\frac{160}{\sqrt{10}}$$

So, lower and upper limits of the 95% confidence interval are:

$$411,82 < \alpha < 610,18$$

### ***Answer:***

t = 1,96, $411,82 < \alpha < 610,18$