## Answer on Question \#44384 - 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 $\bar{x}=511, \delta=160, n=10 . \quad \Phi(t)-$ 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 |

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

$\mathrm{t}=1,96, \quad 411,82<\alpha<610,18$

