Statistics

Lecture 35

Feb 19-8:47 AM

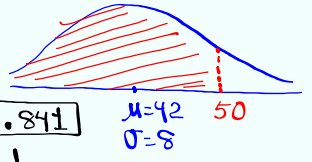
Suppose ages of teachers in LAUSD are normally distributed with mean of 42 yrs and Standard dev. of 8 yrs. $N(42,8)$

If we randomly select one teacher, find the prob. that he/she is

a) below 50 yrs old.

$P(x<50)$

=normalcdf(-E99,50,42,8)= .841

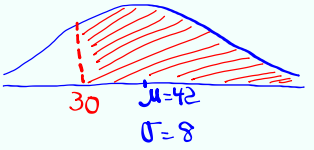


b) more than 30 yrs old.

$P(x>30)$

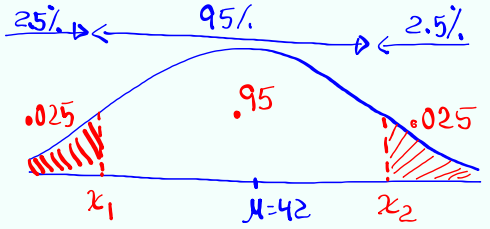
=normalcdf(30,E99,42,8)

= .933



Oct 31-8:50 AM

Find two ages, round to whole numbers that separate the middle 95% from the rest.



$x_1 = \text{invNorm}(.025, 42, 8) \approx$ 26

$\sigma = 8$

$x_2 = \text{invNorm}(.975, 42, 8) \approx$ 58

Recall usual Range $\mu \pm 2\sigma$

95% Range $= 42 \pm 2(8)$

$= 42 \pm 16$

$\Rightarrow$ 26 to 58

Oct 31-8:58 AM

Consider the list below

1 3 5 7

Store in L1,

Use 1-Var Stats

wit L1 only

Find

$\mu = 4$

$\sigma = 2.236$

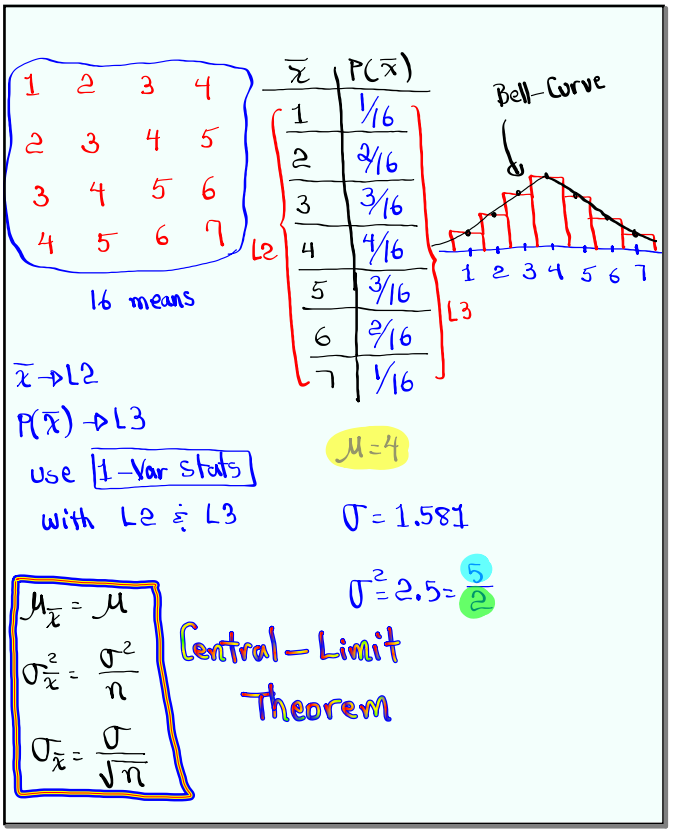
$\sigma^2 = 5$

Take all Samples with Size 2 with replacement

Find $\bar{x}$ of each Sample

1,1	1,3	1,5	1,7	1	2	3	4
3,1	3,3	3,5	3,7	2	3	4	5
5,1	5,3	5,5	5,7	3	4	5	6
7,1	7,3	7,5	7,7	4	5	6	7

Oct 31-9:03 AM



Oct 31-9:10 AM

Clear all lists

Store the following in L1

1 3 5 7 9

use 1-Var Stats with L1 only.

Find

μ = 5

σ = 2.828

σ² = 8

Take all Samples of Size 2 with replacement

Find x̄ of each Sample

1,1	1,3	1,5	1,7	1,9
3,1	3,3	3,5	3,7	3,9
5,1	5,3	5,5	5,7	5,9
7,1	7,3	7,5	7,7	7,9
9,1	9,3	9,5	9,7	9,9

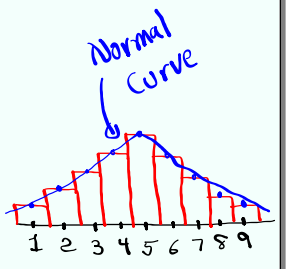
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9

Oct 31-9:20 AM

1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9

25 means

$\bar{x}$	$P(\bar{x})$
1	1/25
2	2/25
3	3/25
4	4/25
5	5/25
6	4/25
7	3/25
8	2/25
9	1/25



$\bar{x} \rightarrow L2$, $P(\bar{x}) \rightarrow L3$

Use 1 - VarStats

with L2 & L3

$\mu = 5$

$\sigma = 2$

$\sigma^2 = 4 = \frac{8}{2}$

CLT Says

$\mu_{\bar{x}} = \mu$

$\sigma_{\bar{x}}^2 = \frac{\sigma^2}{n}$

$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

Oct 31-9:26 AM

Ages of teachers in LAUSD are N.D.
with $\mu = 42$ & $\sigma = 8$.

If we randomly select 4 teachers,

find $\mu_{\bar{x}} = \mu = 42$

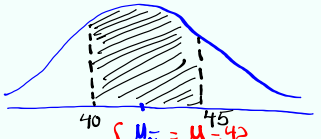
$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{8}{\sqrt{4}} = \frac{8}{2} = 4$

Find the Prob. that their mean age ($\bar{x}$) is between 40 & 45.

$P(40 < \bar{x} < 45)$

= normalcdf(40, 45, 42, 4)

= .465



CLT $\mu_{\bar{x}} = \mu = 42$, $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{8}{\sqrt{4}} = 4$

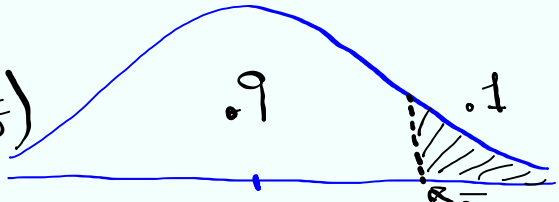
Oct 31-9:35 AM

Find the mean age $\bar{x}$ for randomly selected groups of 5 teachers ($n=5$) that separate the top 10% from the rest.

Right area .1

$\bar{x} = \text{invNorm}(.9, 42, 8/\sqrt{5})$

$\approx 46.585 \approx 47$



CLT $\begin{cases} \mu_{\bar{x}} = \mu = 42 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{8}{\sqrt{5}} \end{cases}$

Oct 31-9:42 AM

Salaries of nurses in LA county has a normal dist. with $\mu = \$7200$ and $\sigma = 500$.

If we randomly select 16 nurses,

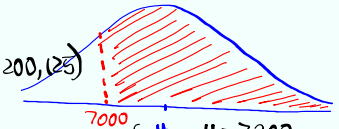
CLT $\begin{cases} \mu_{\bar{x}} = \mu = 7200 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{500}{\sqrt{16}} = \frac{500}{4} = 125 \end{cases}$

Find the Prob. that their mean ($\bar{x}$) Salary is more than \$7000.

$P(\bar{x} > 7000)$

=normalcdf(7000, E99, 7200, 125)

$\approx .945$



CLT $\begin{cases} \mu_{\bar{x}} = \mu = 7200 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{500}{\sqrt{16}} = 125 \end{cases}$

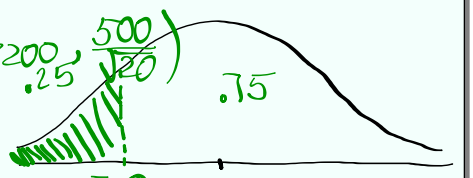
Oct 31-9:47 AM

Find $\bar{x} = Q_1$ for randomly selected groups of 20 nurses. Round to whole #.

$\bar{x} = Q_1 = \text{invNorm}(.25, 7200, \frac{500}{\sqrt{20}})$

$= 7124.5897\ldots$

$\approx \$7125$



$\bar{x} = Q_1$

CLT $\begin{cases} \mu_{\bar{x}} = \mu = 7200 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{500}{\sqrt{20}} \end{cases}$

SG 18, 19, 20, and 21

Oct 31-9:53 AM