Statistics
Spring 2023
Lecture 37

Class QZ 10

Given $N(130, 15)$

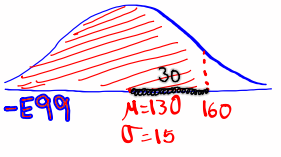
Drawing, labeling, shading, and TI command required!

Find

1) $P(x < 160)$

= normalcdf(-E99, 160, 130, 15)

= .977 ✓



2) $P(x > 100)$

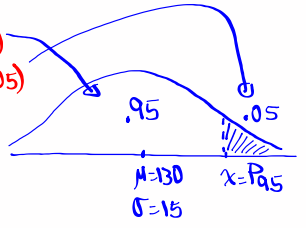
= normalcdf(100, E99, 130, 15)

= .977 ✓

3) Find $x = P_{95}$, Round-up to whole #

95% below (left Area .95)

5% above (Right Area .05)



x = invNorm(.95, 130, 15)

= 154.673 ≈ 155

Assume Credit Scores are normally dist with the mean of 700 and standard deviation of 75.

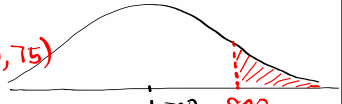
$N(700, 75)$

If we randomly select one person find the Prob. that his/her Credit Score (x) is above 800. ($x > 800$)

$P(x > 800)$

= normalcdf(800, E99, 700, 75)

= .091 $\approx$ 9%



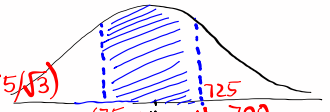
$n = 3$

If we randomly select 3 people find the Prob. that their mean Credit Score ($\bar{x}$) is between 675 and 725. ($675 < \bar{x} < 725$)

$P(675 < \bar{x} < 725)$

= normalcdf(675, 725, 700, 75/√3)

= .436 $\approx$ 44%



CLT $\begin{cases} \mu_{\bar{x}} = \mu = 700 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{75}{\sqrt{3}} \end{cases}$

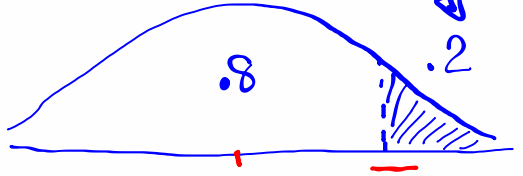
For randomly selected group of 4 people, $n = 4$

find their mean Credit Score that Separates the top 20% from the rest.

$\bar{x}$ = invNorm(.8, 700, 37.5)

= 731.561

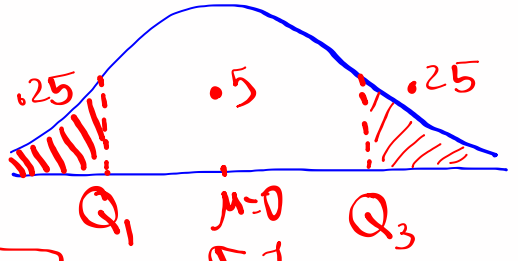
$\approx$ 732



CLT $\begin{cases} \mu_{\bar{x}} = \mu = 700 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{75}{\sqrt{4}} = \frac{75}{2} = 37.5 \end{cases}$

Find Q_1 & Q_3 for Standard normal Prob. dist.

$\mu = 0$, $\sigma = 1$



$Q_1 = \text{invNorm}(.25, 0, 1) = \boxed{-.674}$

$Q_3 = \text{invNorm}(.75, 0, 1) = \boxed{.674}$

Ages of teachers in LAUSD have a normal dist with $\mu = 45.8$ yrs and $\sigma = 6.2$ yrs.

$N(45.8, 6.2)$

If we randomly select one teacher find the prob. that his/her age is x

a) below 40 or above 50.

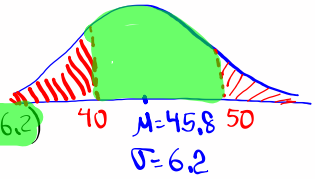
$x < 40$ $\quad x > 50$

$P(x < 40 \text{ OR } x > 50)$

$= 1 - P(40 < x < 50)$

$= 1 - \text{normalcdf}(40, 50, 45.8, 6.2)$

$= \boxed{.424}$



b) below 40 and above 50.

$P(x < 40 \text{ AND } x > 50) = \boxed{0}$

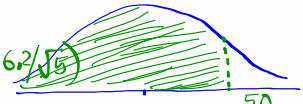
M.E.E.

If we randomly select 5 teachers ($n=5$) find the Prob. that their mean age ($\bar{x}$) is below 50. $\bar{x}<50$

$P(\bar{x}<50)$

$=$ normalcdf$(-E99, 50, 45.8, 6.2/\sqrt{5})$

$=.935$

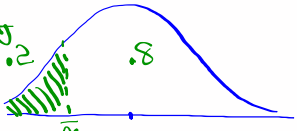


CLT $\begin{cases} \mu_{\bar{x}} = \mu = 45.8 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{6.2}{\sqrt{5}} \end{cases}$

For randomly selected group of 6 teachers ($n=6$) find their mean age ($\bar{x}$) rounded to 1-decimal, that separate the bottom 20% from the rest.

$\bar{x} =$ invNorm$(.2, 45.8, 6.2/\sqrt{6})$

$= 43.670 = 43.7$ yrs.



CLT $\begin{cases} \mu_{\bar{x}} = \mu = 45.8 \\ \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{6.2}{\sqrt{6}} \end{cases}$

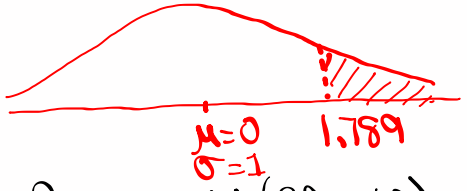
Class QZ 11

Drawing, labeling, shading, TI command required.

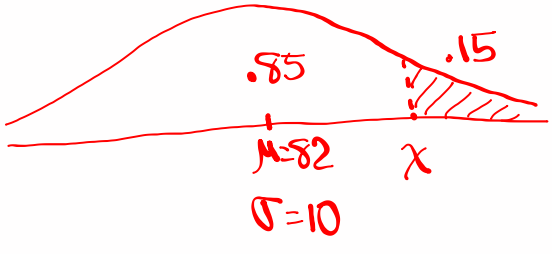
1) Find twice the area to the right of $Z = 1.789$

2*normalcdf(1.789, E99, 0, 1)

$= .074$



2) Given $N(82, 10)$, find $x = P_{85}$, Round-up to a whole #



$x =$ invNorm$(.85, 82, 10)$

$= 92.364$

≈ 93