

**Statistics**  
**Spring 2023**  
**Lecture 34**



Feb 19-8:47 AM

The wait time at the express lane in the local grocery store is no more than 10 minutes and has a uniform prob. dist.  $0 \leq x \leq 10$

1) Find the prob. that your wait time is between 5 and 7.5 minutes.

$$P(5 < x < 7.5) = (7.5 - 5) \cdot \frac{1}{10}$$

$$= 2.5 \cdot \frac{1}{10} = \frac{5}{2} \cdot \frac{1}{10} = \frac{1}{4} = \boxed{.25}$$

2) Find the time that separates the top 15% from the rest.

$$1 - .15 = .85$$

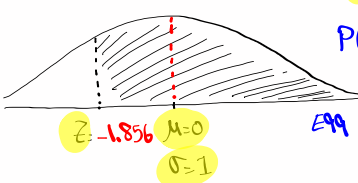
$$(x - 0) \cdot \frac{1}{10} = .85$$

$$x = 10(.85) \quad \boxed{x = 8.5}$$

Apr 17-7:17 AM

Find the area shaded below

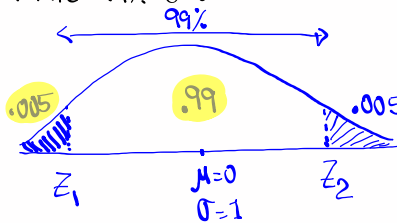
Standard normal prob. dist.



$P(Z > -1.856) =$   
 $\text{normcdf}(-1.856, \infty, 0, 1) =$   
 $.968$

Find two Z-values, rounded to 3-decimal places, that separate the middle 99% from the rest.

$1 - .99 = .01$   
 $.01 \div 2 = .005$



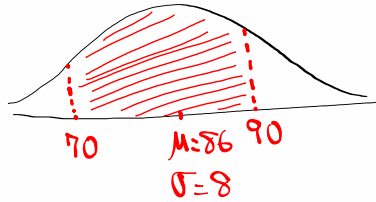
$z_1 = \text{invNorm}(.005, 0, 1) = -2.576$   
 $z_2 = \text{invNorm}(.995, 0, 1) = 2.576$

Apr 17-7:27 AM

Consider a normal Prob. dist. with  $\mu = 86$  and  $\sigma = 8$

$N(86, 8)$

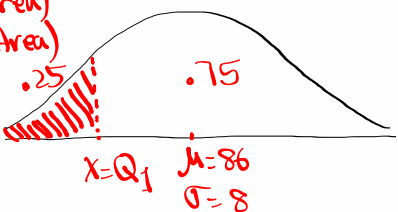
1)  $P(70 < X < 90)$   
 $= \text{normalcdf}(70, 90, 86, 8)$   
 $= .669 \approx 67\%$



2) Find  $x = Q_1$ , round to a whole #.

25% below (Left Area)  
 75% above (Right Area)

$x = \text{invNorm}(.25, 86, 8)$   
 $= 80.604 \approx 81$



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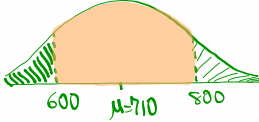
Credit Scores are normally dist. with the mean of 710 and standard deviation of 65.  
 $N(710, 65)$

If we randomly select one person, find the prob. that his/her credit score is below 600 or above 800.

$P(x < 600 \text{ OR } x > 800)$

$= 1 - P(600 < x < 800)$

Total Area

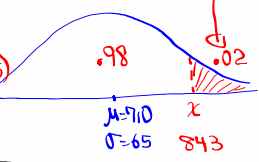


$= 1 - \text{normalcdf}(600, 800, 710, 65) = 0.128$

Find a credit score, round to a whole # that separates the top 2% from the rest.

$1 - .02 = .98$

$x = \text{invNorm}(.98, 710, 65)$



$= 843.494 \approx 843$

If we round-up  $\Rightarrow 844$

Apr 17-7:44 AM

clear all lists. SG 20

Store 2, 6, 10, and 14 in L1.

Use 1-Var Stats with L1 only to find

$\mu = \bar{x} = 8$        $\sigma = \sigma_x = 4.472$        $\sigma^2 = 20$

Take all samples of size 2 with replacement from this list.

2,2	2,6	2,10	2,14
6,2	6,6	6,10	6,14
10,2	10,6	10,10	10,14
14,2	14,6	14,10	14,14

Now find  $\bar{x}$  of each sample.

2	4	6	8
4	6	8	10
6	8	10	12
8	10	12	14

16 means

$\bar{x}$	$P(\bar{x})$
2	1/16
4	2/16
6	3/16
8	4/16
10	3/16
12	2/16
14	1/16

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L2 $\bar{x}$	L3 $P(\bar{x})$
2	1/16
4	2/16
6	3/16
8	4/16
10	3/16
12	2/16
14	1/16

Draw Prob. dist. histogram

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

use 1-Var Stats with L2 & L3

to find

$\mu = 8$                        $\sigma = 3.162$                        $\sigma^2 = 10$

Apr 17-8:07 AM

Clear all lists.

Store 2,4,6,8, and 10 in L1

Use 1-Var Stats with L1 only to find

$\mu = 6$                        $\sigma = 2.828$                        $\sigma^2 = 8$

Now take all samples of size 2 with replacement from this list.

2,2	2,4	2,6	2,8	2,10
4,2	4,4	4,6	4,8	4,10
6,2	6,4	6,6	6,8	6,10
8,2	8,4	8,6	8,8	8,10
10,2	10,4	10,6	10,8	10,10

Now find  $\bar{x}$  of each sample.

2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9
6	7	8	9	10

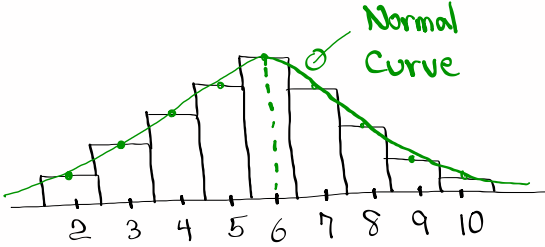
$\rightarrow$  25 means

$\bar{x}$	$P(\bar{x})$
2	1/25
3	2/25
4	3/25
5	4/25
6	5/25
7	4/25
8	3/25
9	2/25
10	1/25

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$\bar{x}$	$P(\bar{x})$
2	$1/25$
3	$2/25$
4	$3/25$
5	$4/25$
6	$5/25$
7	$4/25$
8	$3/25$
9	$2/25$
10	$1/25$

Draw Prob. dist. histogram



$\bar{x} \rightarrow L2, P(\bar{x}) \rightarrow L3$   
Use 1-Var stats with L2 & L3

to find

$\mu = 6$                        $\sigma = 2$                        $\sigma^2 = 4$

SG 18  $\Rightarrow$  Refresh your browser.  
SG 19

Apr 17-8:23 AM