Statistics

Lecture 17

Feb 19-8:47 AM

Prob. Dist. with continuous Variable (SG 17)

Measureable

1) uniform Prob. dist.

2) Standard Normal Prob. Dist.

3) Normal Prob. dist.

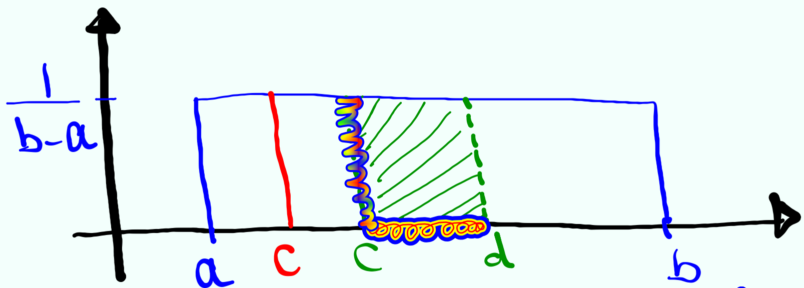
4) Central limit theorem **CLT**

5) Applications

Apr 29-9:57 AM

Uniform Prob. dist. :

Let x be a continuous random variable for all values from a to b with uniform Prob. dist.



$P(x=c)=0$ $\qquad$ $P(c<x<d)=(d-c)\cdot\frac{1}{b-a}$

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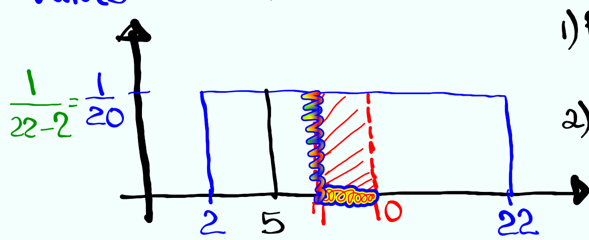
Consider a uniform Prob. dist. for all values from 2 to 22.



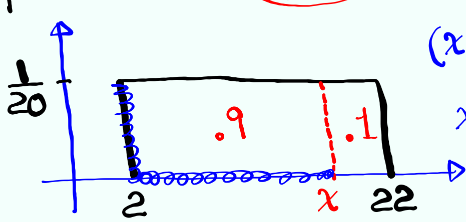
1) $P(x=5)=0$

2) $P(7<x<10)$

$=(10-7)\cdot\frac{1}{20}$

$=\boxed{\frac{3}{20}}=\boxed{.15}$

3) Find a value that seprates the top 10% from the rest.



$(x-2)\cdot\frac{1}{20}=.9$

$x-2=20(.9)$

$x=2+20(.9)$

$\boxed{x=20}$

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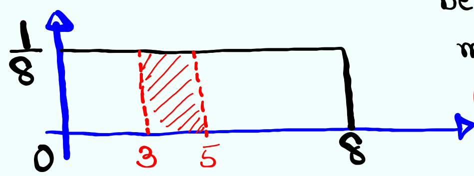
wait time at a local bank to see a teller has a uniform Prob. dist and it may take up to 8 minutes.

1) P(wait time is between 3 to 5 minutes) = $(5-3)\cdot\frac{1}{8} = \frac{2}{8} = \frac{1}{4} = \boxed{.25}$

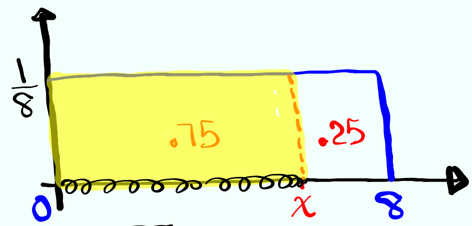


2) Find $x = Q_3$, Round to whole #.

75% below
25% above

$(x-0)\cdot\frac{1}{8} = .75$

$x - 0 = 8(.75) \Rightarrow \boxed{x=6}$



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Standard Normal Prob. Dist.:

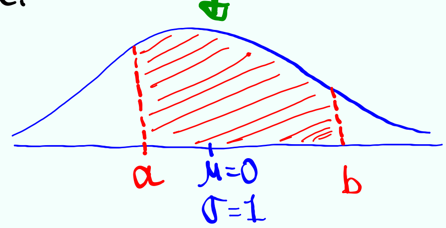
1) we use z, $P(z=c)=0$

2) Graph is symmetric, bell-Shape with total area 1.

3) Mean = Mode = Median

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

$\boxed{P(a<z<b)}$ is the corresponding area within the curve.



How to find it:

$\boxed{\text{2nd}}$ $\boxed{\text{VARS}}$

$\boxed{\text{normalcdf(}}$

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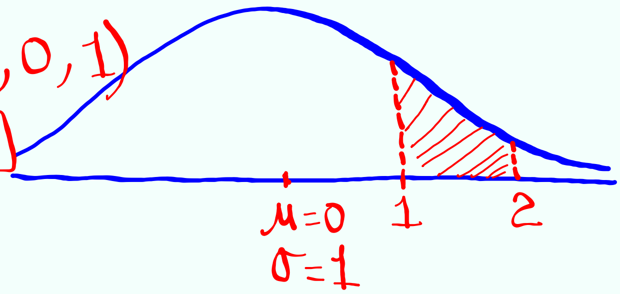
find $P(1 < Z < 2)$

$\boxed{\text{2nd}}$ $\boxed{\text{VARS}}$

normalcdf(1, 2, 0, 1)

$\boxed{\text{Paste}}$ $\boxed{\text{Enter}}$

$\approx \boxed{.136}$

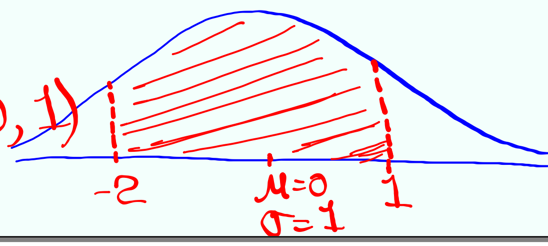


(−)

$P(-2 < Z < 1)$

= normalcdf(−2, 1, 0, 1)

$\approx \boxed{.819}$



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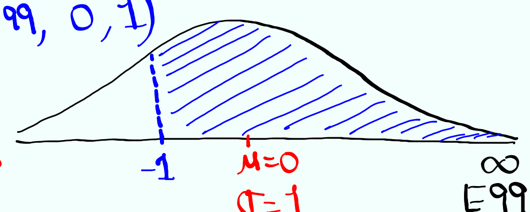
$P(Z > -1)$

normalcdf(−1, E99, 0, 1)

(−) $\boxed{\text{2nd}}\boxed{,}$

$= \boxed{.841}$



E99 ~ 10^{99}

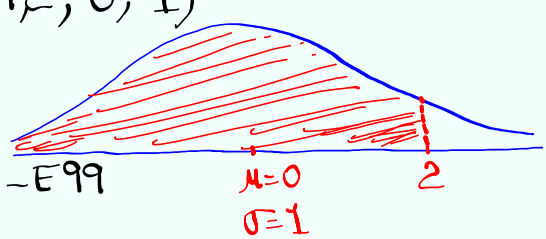
$\boxed{\text{2nd}}\boxed{,}$ $\boxed{7}$

$P(Z < 2)$

(−) $\boxed{\text{2nd}}\boxed{,}$

= normal cdf(−E99, 2, 0, 1)

$= \boxed{.977}$



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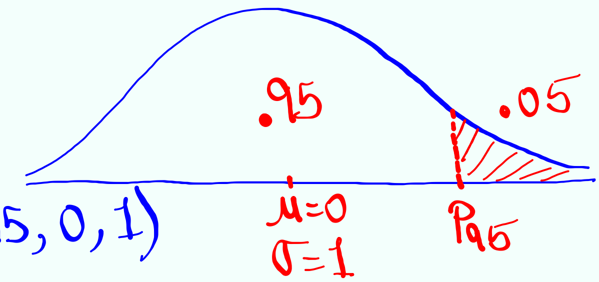
Doing Reverse

Find $z = P_{95}$, Round to 3-dec. Places.

95% below

5% above



$P_{95} = \text{invNorm}(.95, 0, 1)$

$\approx \boxed{1.645}$

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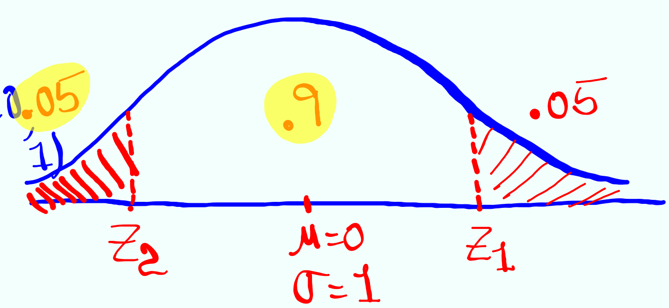
Find two z-Values that Separate the $\boxed{\text{middle } 90\%}$ from the rest.

$z_2 = P_5$

$= \text{invNorm}(.05, 0, 1)$

$= \boxed{-1.645}$



$z_1 = P_{95} = \text{invNorm}(.95, 0, 1) \approx \boxed{1.645}$

SG 17 ✓

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