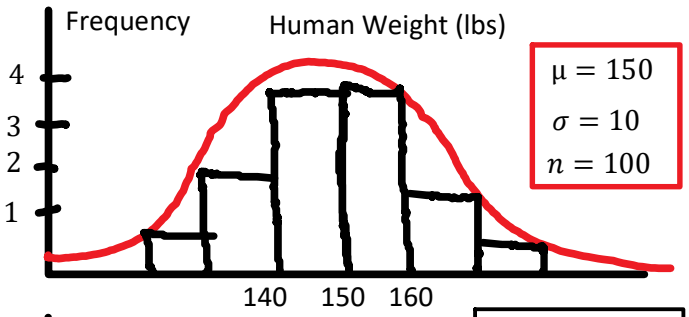
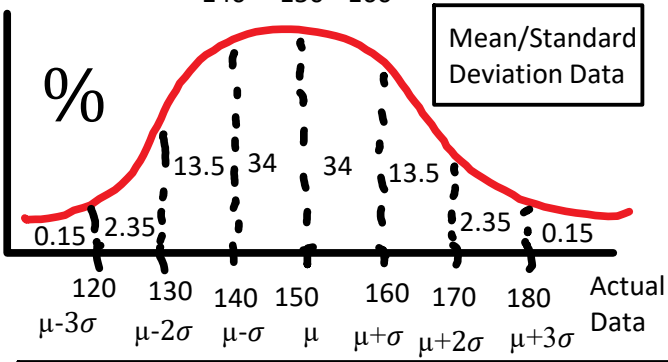
S12 - 3.3 - Normal Distribution Notes



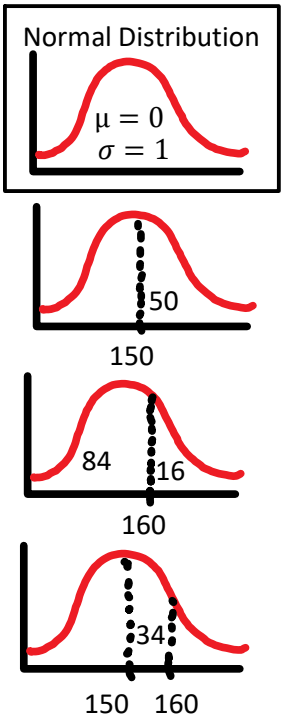
$\mu = 150$
$\sigma = 10$
$n = 100$



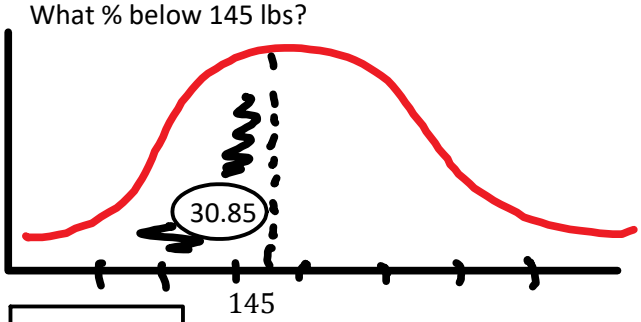
Mean/Standard Deviation Data

-3	-2	-1	0	1	2	3	Z-Data	$\mu = 0$ $\sigma = 1$

The Standard Normal Density Curve (ie. The Bell Curve).
-Symmetrical about the mean, μ.
-Area under the curve is equal to 1.
-About 68% of the area is 1 standard deviation from the mean
-About 95% of the area is 2 standard deviations from the mean
-About 99.7% of the area is 3 standard deviations from the mean.



What % below 145 lbs?



$$Z = \frac{x - \mu}{\sigma}$$

-0.50

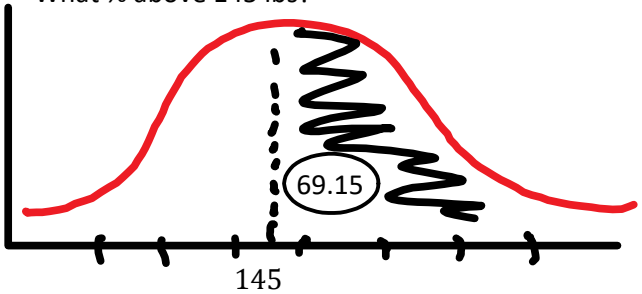
$$Z = \frac{145 - 150}{10}$$

$$Z = \frac{-5}{10}$$

$$Z = -0.50$$

Find Z using formula
Use Z tables to find %
(See Next Page)

What % above 145 lbs?



-0.50 $\quad 100\% - 30.85\% = 69.15\%$

Normcdf(-0.5,1E99,0,1) $= 0.6915$

Ti-84 Calculator Instructions:

2nd | Distr | Normcdf | ENTER | Ti-83(lower,upper,μ,σ)

Normcdf(-1E99,-0.5,0,1) $= 0.3085$

CI : *Confidence Interval*

$$CI = \bar{x} \pm \frac{\sigma_s}{\sqrt{n}} z_{\frac{\alpha}{2}}$$

95% CL(Level)

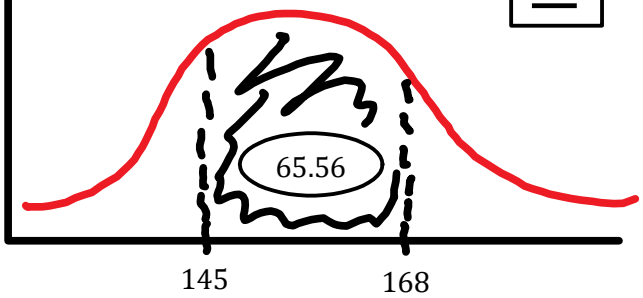
$z_{.90} = 1.645$
$z_{.95} = 1.96$
$z_{.99} = 2.576$

Two Tail

$$CI = 150 \pm (1.96)\left(\frac{10}{\sqrt{100}}\right) = 150 \pm 1.96$$

$$Range: \ 148.04 \le x \le 151.96$$

What % between 145 and 168 lbs?



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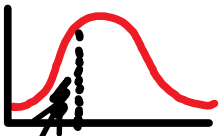

96.41 $\quad$ 168 $\quad$ 1.80

30.85 $\quad$ 145 $\quad$ See Above Left!

$$Z = \frac{x - \mu}{\sigma}$$

$$Z = \frac{168 - 150}{10} = 1.80$$

$96.41\% - 30.85\% = 65.56\%$

Normcdf(-0.5,1.80,0,1) $= 0.6556$