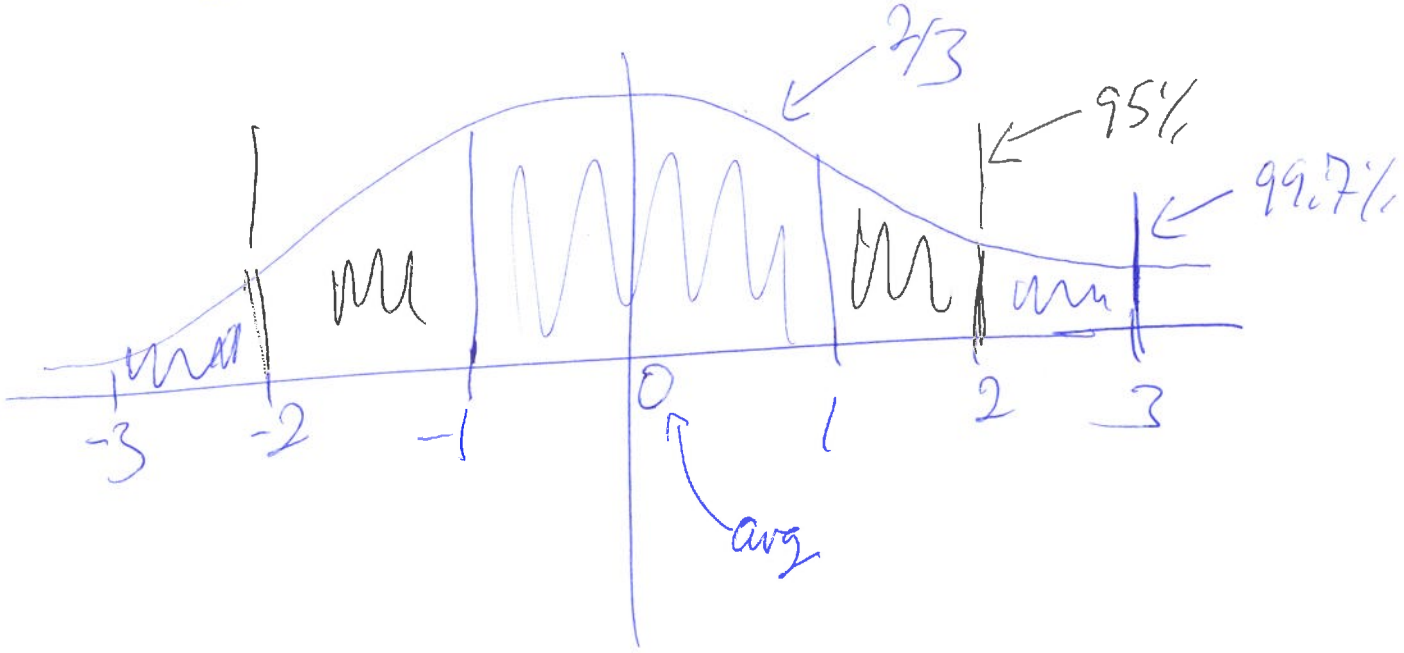
8.5 Normal Distribution

The standard normal distribution has mean $\mu = 0$ and standard deviation $\sigma = 1$.



Ex $X \sim N(0,1)$

↖ Normal distro
mean $\mu = 0$
std dev $\sigma = 1$

$Pr[X = 3] = normalpdf(3, 0, 1) = .0044318$

(μ = 0, σ = 1)

Ex $Z \sim N(0,1)$

(Z is variable to represent std normal)

$Pr[Z = -2] = \text{normalpdf}(-2, 0, 1) = 0.05399$

Ex $X \sim N(0,2)$

$Pr[X = -2] = \text{normalpdf}(-2, 0, 2) = .12099$

Ex $Z \sim N(0,1)$

$Pr[0 \le Z \le 2.4] = \text{normalcdf}(0, 2.4, 0, 1)$

(0 = μ, 1 = σ)

$= 0.4918$

Ex $X \sim N(30, 80)$

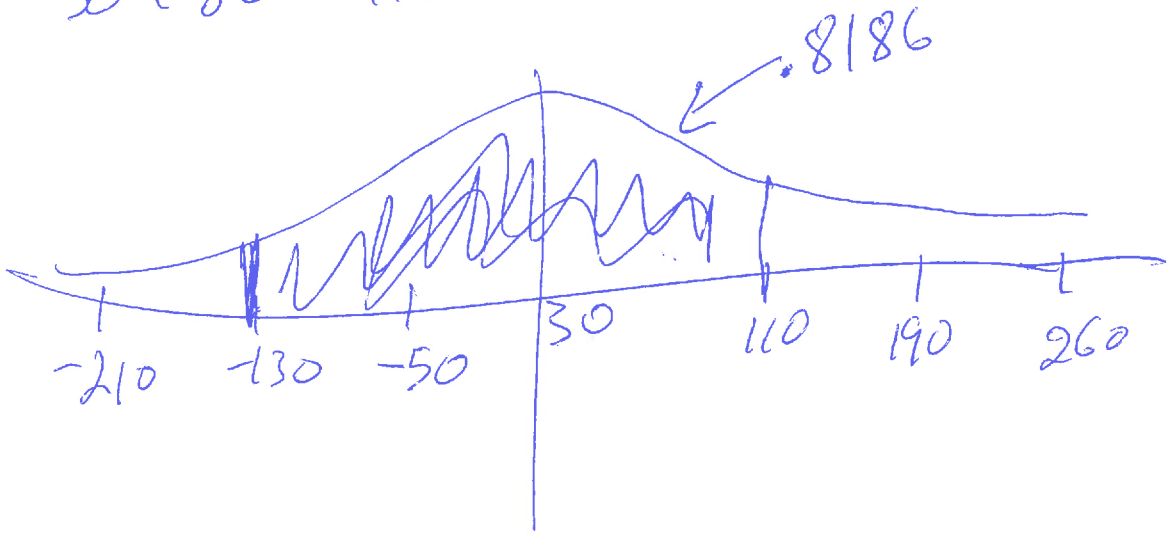
$\Pr[-130 \le X \le 110] = \text{normalcdf}(-130, 110, 30, 80) = .8186$

2σ below avg

σ above avg

$30 - 2(80) = -130$

$30 + 80 = 110$



Ex Quality Control

↳ On avg, $\mu = 50$ lbs/in^2

$\sigma = 0.4$

Reject if reading is more than 1% (0.5) away from μ.

Q What is prob of rejecting?

Start $\Pr[49.5 \le X \le 50.5] = \text{normalcdf}(49.5, 50.5, 50, .4)$

$= .7887$ (Prob of accepting)

Prob Rejecting $= .2113 = 1 - .7887$