3a) $X \sim B(15, 0.25)$

b) mean $= X \times .25 = 3.75$

c) $P(X \geq 10) =$

$$1 - \binom{15}{9}(.25)^9(.75)^6 =$$

$$\binom{15}{10}$$

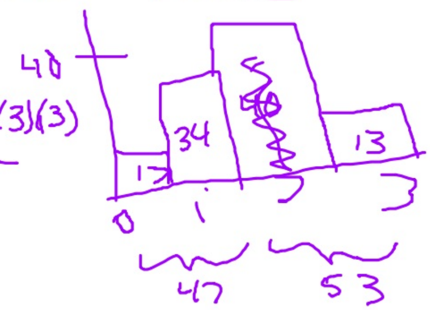
7.949×10^{-4}

0.000795

4a) P(g)

# of girls	0	1	2	3
Frequency	13	34	40	13

$$\frac{(13\times 0)+(34)(1)+(2)(40)+(3)(3)}{100}$$



15.3 The Normal Distribution

- no single normal curve
  - a family of curves defined by their mean μ and std dev σ.

Recall: μ = mean central point of dist

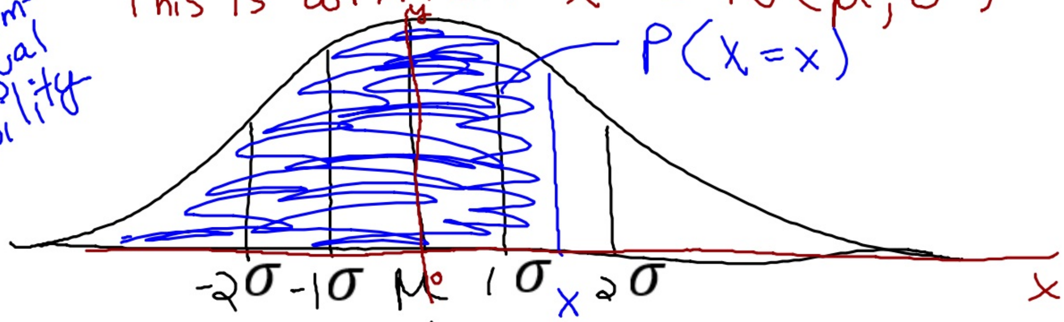
σ = std dev - describes spread (how far you are from the mean)

σ^2 = Variance

If a random variable X, has normal distribution with mean μ and std dev σ

This is written $X \sim N(\mu, \sigma^2)$

The Area under the curve (cumulative) is equal to the probability $P(X=x)$



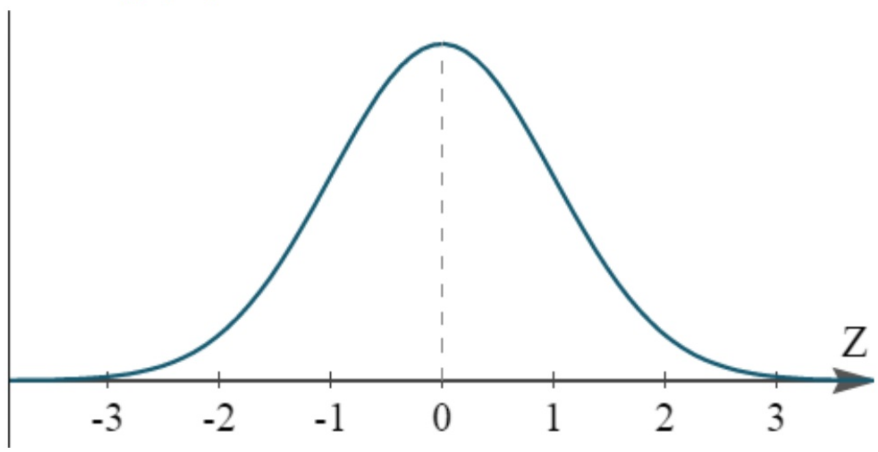
Left → Right

1 std dev from the mean

The Standard Normal Distribution:

- is the Normal Distribution where $\mu=0$ and $\sigma=1$. The random variable is Z and uses 'z-scores' or 'z-values' to describe the number of standard deviations any value is away from the mean.

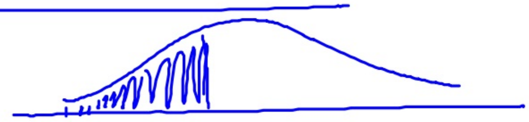
Z - N(0,1)



2nd VARS

USING CALCULATOR TO FIND Z-VALUE:

normalcdf(lower limit, upper limit, μ, σ)



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

a) $P(-2 < Z < 1) = 0.819$

b) $P(Z < 1) = 0.841$

c) $P(Z > -1.5) = 0.933$

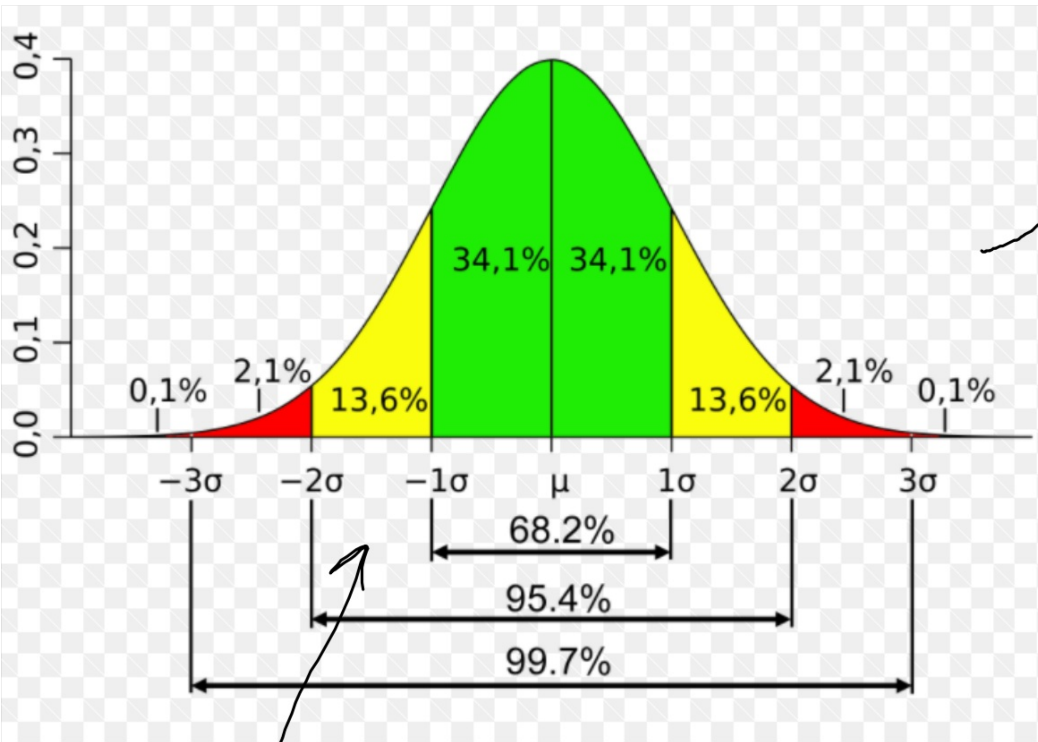
d) $P(|Z| > 0.8) = 0.424$

HW 15H
#1,6

1 − normalcdf(−0.8, 0.8, 0, 1)

cdf − cummulative prob for an area

pdf − probab. for 1 #



Skewed right

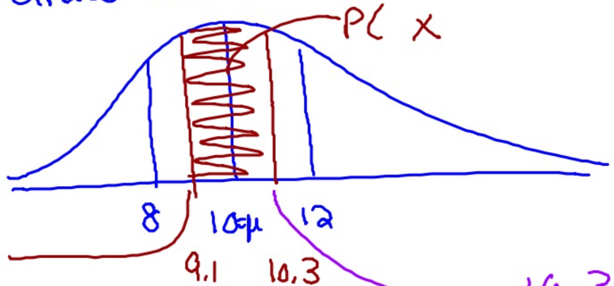
THIS OCCURS IN A PERFECT WORLD

BUT, WE CAN TAKE ANY NORMAL DIST $X \sim N(\mu, \sigma)$ AND TRANSFORM IT TO STD NORMAL BY ACCOUNTING FOR ANY SHIFTS OR CHANGES IN SPREAD

IF $X \sim N(\mu, \sigma^2)$ THEN THE TRANSFORMED RANDOM VARIABLE $Z = \frac{X-\mu}{\sigma}$ HAS A TRANSFORMED NORMAL DIST

Ex) $X \sim N(10, 2)$, FIND $P(9.1 < x < 10.3)$

1st draw the curve & i.d. the area



p.543

HW 15I
#1-3

z?

$$z = \frac{10.3-10}{2} = 0.15$$

$$z = \frac{9.1-10}{2} = -0.45$$

$$P(9.1 < x < 10.3) = P(-0.45 < Z < 0.15)$$

$$= \text{normalcdf}(-.45, 0.15, 0, 1)$$

$$= 0.233$$