Statistics 300: Elementary Statistics

Section 6-3

Applications of Normal Distributions

- **Given: X ~ N(μ, σ)**
- **Determine P(a < x < b)**
- **Determine k^{th} Percentile (P_k)**

Given x ~ Normal(μ, σ) Determine P(a < x < b)

- **Step 1: Convert "a" and "b" to z-scores**
- **Step 2: Use Table A-2 to find (b)Big Area and (a)Small Area**
- **Step 3: Subtract Small Area from Big Area**

Given x ~ Normal(100,15)
Determine P(119.2 < x < 129.4)

- **Step 1:**

$$z(129.4) = \frac{129.4 - 100}{15}$$

$$= 1.96$$

Given x ~ Normal(100,15)
Determine P(119.2 < x < 129.4)

- **Step 1:**

$$z(119.2) = \frac{119.2 - 100}{15}$$

$$= 1.28$$

Step 2

Table A.2	0 = mean			
	1 = st. dev.			
"z"		0.06		
1.9		0.9750		
		prob.		

Step 2

Table A.2	0 = mean			
	1 = st. dev.			
"z"		0.08		
1.2		0.8997		
		prob.		

Step 3
Subtract Small from Large

Probability =

Large Area - Small Area =

0.9750 - 0.8997 = 0.0753

Given x ~ Normal(48.6,12.22)
Determine P(40 < x < 60)

- **Step 1:**

$$z(60) = \frac{60 - 48.6}{12.22}$$

$$= 0.93$$

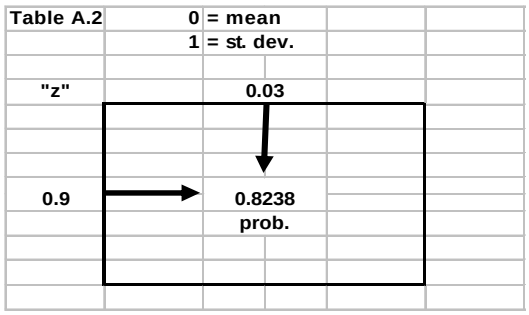
Given x ~ Normal(48.6,12.22)
Determine P(40 < x < 60)

- **Step 1:**

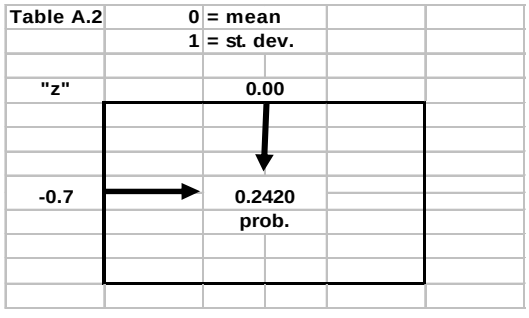
$$z(40) = \frac{40 - 48.6}{12.22}$$

$$= -0.70$$

Step 2



Step 2



Step 3
Subtract Small from Large

Probability =

Large Area - Small Area =

0.8238 - 0.2420 = 0.5818