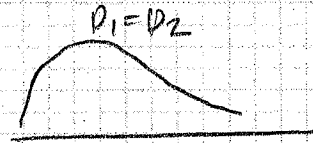


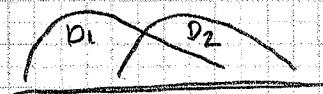
# THE WILCOXON RANK SUM TEST

$H_0$ :  $D_1$  and  $D_2$  are identical

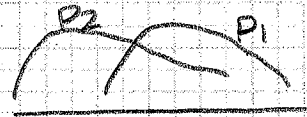


**Step 1**

$H_a$ : 1)  $D_1$  is shifted left of  $D_2$



2)  $D_1$  is shifted right of  $D_2$



3)  $D_1$  is shifted left or right of  $D_2$

**Step 2**

Calculate the test statistic

First Sample

Second Sample

Observations	Ranks
20	6
23	9.5
19	4
21	7
19	4
22	8
<hr/>	
$T_1 = 38.5$	

Observations	Ranks
27	13
19	4
23	9.5
25	12
18	2
24	11
17	1
<hr/>	
$T_2 = 62.5$	

$n_1 = 6$

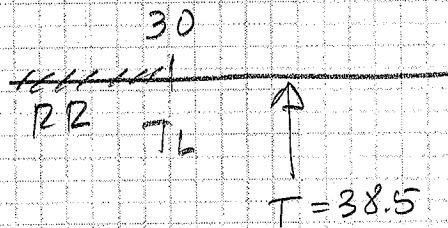
$n_2 = 7$

$T_2 = 62.5$

Obs	17	18	19	19	19	20	21	22	23	23	24	25	27
	1	2	3	4	5	6	7	8	9	10	11	12	13
Ranks	1	2	4	4	4	6	7	8	9.5	9.5	11	12	13

Step 4 Decision

Fail to reject  $H_0$



Step 5 Conclusion

"The data provide insufficient evidence, at  $\alpha = .05$ , to conclude that distribution  $D_1$  is shifted left of distribution  $D_2$ "

The test statistic is the sum of the ranks of the sample with fewer observations

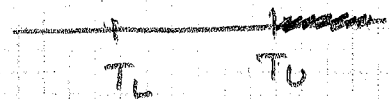
$$T = T_1 = 38.5$$

**Step 3** Rejection Region

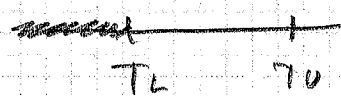
$H_a: D_1$  is shifted right of  $D_2$



If  $T = T_1$  then RR:  $T_1 \geq T_U$

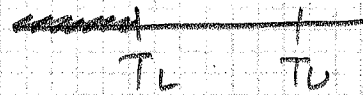


If  $T = T_2$  then RR:  $T_2 \leq T_L$

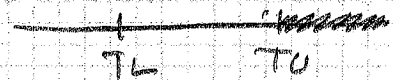


$H_a: D_1$  is shifted left of  $D_2$   $\checkmark \alpha = .05$

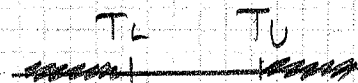
If  $T = T_1$  then RR:  $T_1 \leq T_L$



If  $T = T_2$  then RR:  $T_2 > T_U$



$H_a: D_1$  is shifted left or right of  $D_2$



$$RR: T \leq T_L \text{ or } T \geq T_U$$

$$RR: T_1 \leq 30$$

