

10.2.2)

$$a) R_y = 8 + 13 + 12 + 7 + 15 + 5 + 10 + 14 = 84$$

$$p\text{-value} = \mathbb{P}\left(Z > \frac{84 - 64}{8.64}\right) \approx 0.01$$

$$b) \Delta = \text{med}(y_j - x_i) = 26$$

c) 95% CI is $[D(5), D(6)]$ where:

$$t = \frac{mn}{2} + z_{1-\alpha/2} \cdot \sigma_w \approx 45 \quad \left. \begin{array}{l} \\ \end{array} \right\} \text{ CI is } [7, 51]$$

$$s = \frac{mn}{2} + \frac{1}{2} - z_{1-\alpha/2} \cdot \sigma_w \approx 12$$

$$d) \text{ CI: } (\bar{y} - \bar{x}) \pm t_{.975, 13} \cdot \sqrt{S_{xy}^2 \left(\frac{1}{m} + \frac{1}{n}\right)}$$

$$\approx (6.2836, 48.466)$$

$$e) p_i = \Phi\left(\Delta / \sqrt{20^2}\right) \approx .8116$$

$$\gamma(\Delta) \approx \Phi\left(\sqrt{12mn} / (m+n+1) (R(\Delta) - 1/2) - 1.645\right)$$

$$\approx .676$$

$$f) \Phi\left(\Delta / \sqrt{\sigma^2 \left(\frac{1}{n} + \frac{1}{m}\right)} - 1.645\right) \approx .779$$

$$g) p\text{-value} = \mathbb{P}\left(Z > \frac{84.5 - 64}{8.64}\right) \approx .0088$$

$$10.2.5) p\text{-value} = 2 \times \Phi\left(\frac{1399 - 1520}{94.16}\right) \approx .2$$

10.3.5) W^+ is symmetrically distributed around $E(W^+) = 5$ & $\text{Var}(W^+) = 7.5$

$$10.3.9) p\text{-value} = \mathbb{P}(|Z| > \frac{160.5 - 95}{24.84}) \approx .0084$$

by using Sign test:

$$p\text{-value} = 2 \times \text{Bin}(5, 19, 1/2)$$

$$\approx .062$$