STAT 6315
Fall 2020
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Homework 5
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1. Let

$$n_m = 100$$
$$n_w = 100$$
$$\overline{y}_m = 500$$
$$\overline{y}_m = 550$$
$$\overline{s}_m = 120$$
$$\overline{s}_w = 110$$
$$\alpha = 0.05$$
$$Z_{0.025} = 1.96$$

Since n is fairly large, the Z statistic is appropriate. We can use the sample standard deviation to estimate standard error, assuming 2 independent samples:

$$SE = \sqrt{\frac{s_m^2}{n_m} + \frac{s_w^2}{n_w}} = \sqrt{\frac{120^2}{100} + \frac{110^2}{100}} = \sqrt{144 + 121} = \sqrt{265} \approx 16.2788$$

$$CI = [-50 - 1.96(16.2788),\ -50 + 1.96(16.2788)] = [-50 - 31.9064,\ -50 + 31.9064] = [-81.9064,\ -18.0936]$$

The 95% confidence interval is [-81.9064, -18.0936].

2. The **confidence interval cannot be found**.

To find a paired sample confidence interval, it would be necessary to know the dependence between samples (below, p) such that the standard deviation could be estimated with

$$\sigma_{\overline{y}_1 - \overline{y}_2} = \sqrt{\frac{s_1^2 + s_2^2 - 2s_1 s_2 p}{n}}.$$