

5C Hypothesis Testing for the Difference Between Means

Distribution of $\bar{X} - \bar{Y}$, where $\bar{X}$ and $\bar{Y}$ are the means of samples from independent normal populations X and Y:

Test statistic for the difference between two means:

When the distributions of X and Y are not normal:

1. The weights of boys and girls in a certain school are known to be normally distributed with standard deviations of 5 kg and 8 kg respectively. A random sample of 25 boys had a mean weight of 48 kg and a random sample of 30 girls had a mean weight of 45 kg.
Stating your hypotheses clearly, test, at the 5% level of significance, whether there is evidence that the mean weight of the boys in the school is greater than the mean weight of the girls.

2. The weights of boys and girls in a certain school are known to be normally distributed with standard deviations of 5 kg and 8 kg respectively. A random sample of 25 boys had a mean weight of 48 kg and a random sample of 30 girls had a mean weight of 45 kg.

Stating your hypotheses clearly, test, at the 5% level of significance, whether there is evidence that the mean weight of the boys in the school is more than 2 kg greater than the mean weight of the girls.

3. A manufacturer of personal stereos can use batteries made by two different manufacturers. The standard deviation of lifetimes for Never Die batteries is 3.1 hours and for Everlasting batteries is 2.9 hours. A random sample of 80 Never Die batteries and a random sample of 90 Everlasting batteries were tested and their mean lifetimes were 7.9 hours and 8.2 hours respectively.

Stating your hypotheses clearly, test, at the 5% level of significance, whether there is evidence of a difference between the mean lifetimes of the two makes of batteries.