Section 12.1

Equal sample sizes for each sample.

One-Way Analysis of Variance

ANOVA

Comparing means from 3 or more Samples. *

* This is simplest when all sample sizes (n) are all equal.

Temperatures of sick patients after receiving a treatment

	Placebo	Aspirin	Anacin	Tylenol	Bufferin
	98.3	98.0	97.2	95.1	96.1
	98.7	96.6	97.4	95.7	96.5
	98.1	95.3	96.9	94.4	95.4
	99.9	98.1	97.8	97.2	98.2
	96.2	94.6	94.7	93.7	94.5
	98.6	96.6	97.0	95.7	96.5
	98.3	96.2	96.8	95.3	96.2
$\bar{x}$	98.30	96.20	96.83	95.30	96.20
s	1.10	1.11	1.00	1.11	1.13
s^2	1.21	1.22	1.00	1.22	1.29
n	7	7	7	7	7

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$

H_1: at least one mean is different

$k = 5$

Hypotheses: $H_0: \mu_1 = \mu_2 = \mu_3 = \dots = \mu_k$ ← k populations/treatments, H_1: at least one mean differs

Gather data: $\bar{x}$, s^2, n from each sample (here we assume all n's are equal)

✓ n = common sample size, k = # of pop's/treatments

Requirements: All populations are normal with equal variances (these are not strict).

Test Statistic: $F = \dfrac{n s_{\bar{x}}^2}{s_p^2}$, $s_{\bar{x}}^2 = (\text{std. dev. of } \bar{x} \text{ val's})^2$, s_p^2 = mean of s^2 values.

$s_{\bar{x}}^2 = 1.1120^2 \approx 1.2366$, $s_p^2 = \dfrac{1.21 + 1.22 + 1.00 + 1.22 + 1.29}{5} = 1.188$

T.S. $F = \dfrac{n s_{\bar{x}}^2}{s_p^2} = \dfrac{7 \cdot 1.2366}{1.188} \approx 7.2864$.