Math 158 – Spring 2018
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warm-up # 6

Name: _____

Suppose a researcher does a randomized experiment to compare the mean weight loss for three different programs for losing weight, and the observed weight loss (in lbs.) after three months are as follows:

Program 1	Program 2	Program 3
7	9	15
9	11	12
5	7	18
7		

The following statistics (in lbs.) are given for the data:

	sample size	mean	st. dev
Program 1	4	7	1.63
Program 2	3	9	2.00
Program 3	3	15	3.00
Total	10	10	4.06

1. Find SSTR ($= \sum_{i=1}^{r} n_i(\overline{Y}_{i\cdot} - \overline{Y}_{\cdot\cdot})^2$) and SSE ($= \sum_{i=1}^{r}(n_i - 1)s_i^2$).

$$
\begin{aligned}
SSTR &= 4(7-10)^2 + 3(9-10)^2 + 3(15-10)^2 = 114 \\
SSE &= 3(1.63^2) + 2(2^2) + 2(3^2) = 34 \\
SSTO &= \sum_{i=1}^{r}\sum_{j=1}^{n_i}(Y_{ij} - \overline{Y}_{\cdot\cdot})^2 = (n_T - 1)\frac{\sum_{i=1}^{r}\sum_{j=1}^{n_i}(Y_{ij} - \overline{Y}_{\cdot\cdot})^2}{n_T - 1} = (n_T - 1)s^2 = 9(4.06^2) = 148 \\
&= SSTR + SSE
\end{aligned}
$$

2. Complete the following table:

Source	SS	df	MS	F	p-val
Between	114	2	57	11.7	< 0.01
Error (Within)	34	7	4.85	X	X
Total	148	9	X	X	X