**Problem 1**

Branch 1: $n1 = 4$,  y1bar = 17.0 , $S_1^2 = 8.67$

Branch 2: $n2 = 3$, y2bar = 12.3, $S_2^2 = 5.33$

Branch 3: $n3 = 3$, y3bar = 20.0, $S_3^2 = 7.0$

All Data:  $N = 10$, ybar = 16.5, $S^2 = 15.61$

df1  =  k - 1 = 3 - 1 = 2

df2 = N - k = 10 - 3 = 7

df_total = N - 1 = 10 - 1 = 9

Sum of Squares between groups  (SSB):

$SSB = \Sigma[n_i(y_ibar - ybar)^2]$

SSB =  4*(17.0-16.5)^2 + 3*(12.3-16.5)^2 + 3*(20.0-16.5)^2

SSB =  90.67

Sum of Squares Within Groups (SSW):

$SSW = \Sigma[(n_i - 1)s^2_i]$

SSW = (4 - 1)(8.67)  +  (3 - 1)(5.33) + (3 - 1)(7.00)

SSW =  50.67

Total Sum of Squares (SST):


SST = SSB + SSW = 90.67 + 50.67 = 141.34

Mean Square Between (MSB):

MSB = SSB / df1 = 90.67 / 2 = 45.335

Mean Square Within (MSW):

MSW = SSW / df2 = 50.67 / 7 = 7.2385

F = MSB / MSW = 45.335 / 7.239 = 6.263

P - value = F(2,7) at $\alpha$ = 0.05   = 4.74

P(F(2,7) > 6.263) ≈ 0.027

| Source | Degrees of Freedom | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Between Groups | 2 | 90.67 | 45.335 | 6.263 | 0.027 |
| Within Groups | 7 | 50.67 | 7.239 | | |
| Total | 9 | 141.34 | | | |

Since the p-value (0.027) is less than the significance level (α = 0.05), we reject the null hypothesis.
There is sufficient statistical evidence to conclude that the mean number of sick leave days differs significantly among the three bank branches.