

Pabna Cadet College
Solution to 3rd Tutorial Examination
Subject: Mathematics
Class: VII

Time: 40 minutes

Full Marks: 20

Answer all the questions

1.

Given below are the daily income and expense of ten workers.

Income(x)	Expense (y)
120	80
130	120

From above data,

i. Find

$$\sum_{i=1}^2 x_i y_i \text{ and } \left(\sum_{i=1}^2 x_i\right) \left(\sum_{i=1}^2 y_i\right)$$

ii. Are they equal?

iii. Find

$$\sum_{i=1}^2 \sum_{j=1}^2 x_i y_j$$

Which of (i) is equal to it?

iv. Find

$$\sum_{i=1}^2 \sum_{j=1}^2 (x_i - y_j)$$

Solution:

i. Table for calculation

Income (x)	Expense (y)	xy
120	80	9600
130	120	15600
$\sum x = 250$	$\sum y = 200$	$\sum xy = 25200$

Therefore,

$$\sum_{i=1}^2 x_i y_i = 25200$$

$$\left(\sum_{i=1}^2 x_i\right) \left(\sum_{i=1}^2 y_i\right) = 250 \times 200 = 50,000$$

ii. So they are not equal.

iii.

$$\begin{aligned}\sum_{i=1}^2 \sum_{j=1}^2 x_i y_j &= x_1(y_1 + y_2) + x_2(y_1 + y_2) \\ &= 120(80 + 120) + 130(80 + 120) \\ &= 50,000\end{aligned}\tag{1}$$

Thus, this equal to the 2nd part of (i).

iv.

$$\begin{aligned}\sum_{i=1}^2 \sum_{j=1}^2 x_i y_j &= (x_1 - y_1 + x_1 - y_2) + (x_2 - y_1 + x_2 - y_2) \\ &= (120 - 80 + 120 - 120) + (130 - 80 + 130 - 120) \\ &= 100\end{aligned}\tag{2}$$

Solution using R code:

Download R from here: <https://cran.r-project.org/>

```
# Lines starting with hashes (#) are comments, not executable commands.  
x <- c(120,130)  
y <- c(80,120)  
df <- expand.grid(x,y)  
df
```

```
##   Var1 Var2  
## 1  120   80  
## 2  130   80  
## 3  120  120  
## 4  130  120
```

```
# Answer of i  
sum(x*y)
```

```
## [1] 25200
```

```
sum(x)*sum(y)
```

```
## [1] 50000
```

```
# Answer of iii  
sum(df$Var1*df$Var2)
```

```
## [1] 50000
```

```
# Answer of iv  
sum(df$Var1-df$Var2)
```

```
## [1] 100
```

2.i. Stem and Leaf plot

Do not make a table; follow this format

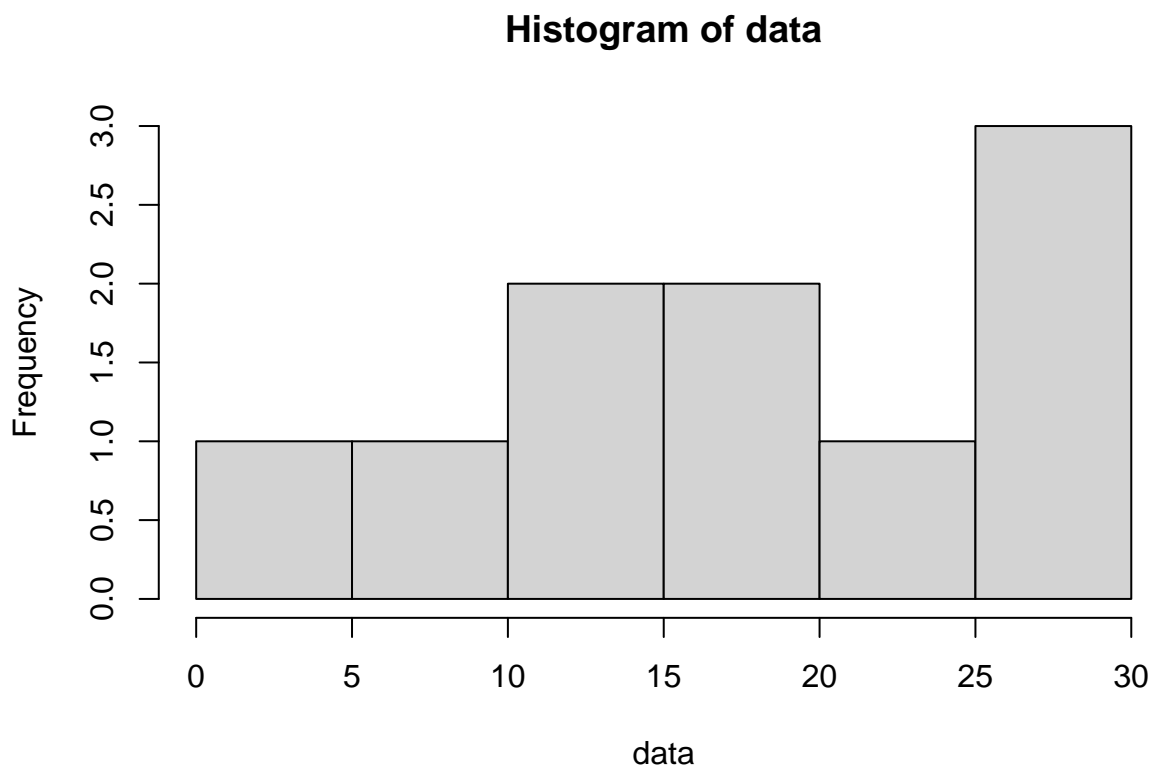
```
data <- c(16, 26, 12, 10, 27, 30, 14, 1, 25, 20)
stem(data)
```

```
##
##  The decimal point is 1 digit(s) to the right of the |
##
##  0 | 1
##  1 | 0246
##  2 | 0567
##  3 | 0
```

2.ii. Ogive

First let's draw a histogram (NOT required; only optional)

```
h <- hist(data)
```



Now the Ogive-

```
intervals <- seq(from = min(h$breaks), to = max(h$breaks), by = h$breaks[2] - h$breaks[1])
intervals <- c(0, intervals[-1])
# Cumulative sums
cf = c(0, cumsum(h$counts))
plot(intervals, cf, type = "b", col = "blue", pch = 20)
grid()
```

