

# Median-median Lines and Mayer Lines

Name: Key

a) For the following data:

- 1) determine the equation of the median-median line.
- 2) predict the value of y when x = 50
- 3) predict the value of x when y = 100

x	2	3	7	8	4	12	6	9	11	15	17	1
y	13	16	29	32	15	45	27	35	47	52	54	12

x	1	2	3	4	6	7	8	9	11	12	15	17
y	12	13	16	15	27	29	32	30	47	45	52	54

Group 1

x	y
1	12
2	13
3	16
4	15

ORDER Ys

MEDIA

$x_1, y_1$   
(2.5, 14)

$$\bar{x} = \frac{x_1 + x_2 + x_3}{3}$$

$$= \frac{2.5 + 7.5 + 13.5}{3}$$

$$= 7.83$$

Group 2

x	y
6	29
7	29
8	32
9	35

$x_2, y_2$   
(7.5, 30.5)

$$\bar{y} = \frac{y_1 + y_2 + y_3}{3}$$

$$= \frac{14 + 30.5 + 49.5}{3}$$

$$= 31.33$$

Group 3

x	y
11	47
12	45
15	52
17	54

ORDER Ys

$x_3, y_3$   
(13.5, 49.5)

$$a = \frac{y_3 - y_1}{x_3 - x_1}$$

$$= \frac{49.5 - 14}{13.5 - 2.5}$$

$$= \frac{35.5}{11}$$

$$= 3.23$$

$$\bar{y} = a\bar{x} + b$$

$$31.33 = 3.23(7.83) + b$$

$$31.33 - 25.29 = b$$

$$6.04 = b$$

$$11. y = 3.23x + 6.04$$

$$y = 3.23(50) + 6.04$$

$$y = 167.54$$

③  $100 = 3.23x + 6.04$   
 $93.96 = 3.23x$   
 $x = 29.1$

b) For the following data:

1) determine the equation of the median-median line.

2) predict the value of y when x = 100

3) predict the value of x when y = 100

x	22	13	27	88	34	12	16	19	11
y	13	16	29	32	15	45	27	35	47

x	11	12	13	16	19	22	27	34	88
y	47	45	16	27	35	13	29	15	32

Group 1

x	y
11	47
12	45
13	16

order 3's

Medians

(12, 45)

$$\bar{x} = \frac{12 + 19 + 34}{3} = 21.67$$

$$\bar{y} = \frac{45 + 27 + 29}{3} = 33.67$$

$$a = \frac{29 - 45}{34 - 12} = \frac{-16}{22} = -0.73$$

$$\begin{aligned} \bar{y} - a\bar{x} &= b \\ 33.67 &= 0.73(21.67) + b \\ 33.67 &= 15.82 + b \\ 49.49 &= b \end{aligned}$$

Group 2

x	y
16	27
19	35
22	13

order 3's

(19, 27)

$$1) \hat{y} = -0.73x + 49.49$$

$$2) \hat{y} = -0.73(100) + 49.49 = -23.51$$

Group 3

x	y
27	29
34	15
88	32

order 3's

(34, 29)

$$3) 100 = -0.73x + 49.49$$

$$50.51 = -0.73x$$

$$-69.19 = x$$

c) For the following data:

- 1) determine the equation of the median-median line.
- 2) predict the value of y when x = 500
- 3) predict the value of x when y = 700

x	102	300	227	248	344	212	226	119	311	415	117
y	138	416	290	332	415	345	270	235	471	512	254

x	102	117	119	212	226	227	248	300	311	344	415
y	138	254	235	345	270	290	332	416	471	415	512

Group 1

x	y	order y's
102	138	138
117	254	254
119	235	235
212	345	345

118

244.5

$$\bar{x} = 224.17$$

$$\bar{y} = 326$$

$$a = \frac{443.5 - 244.5}{327.5 - 118}$$

$$= \frac{199}{209.5}$$

$$= 0.95$$

$$\bar{y} = a\bar{x} + b$$

$$326 = 0.95(224.17) + b$$

$$113.04 = b$$

$$\textcircled{1} \hat{y} = 0.95x + 113.04$$

$$\textcircled{2} y = 0.95(500) + 113.04$$

$$y = 588.04$$

Group 2

x	y	order x's
226	270	226
227	290	227
248	332	248

Group 3

x	y	order y's
300	416	415
311	471	416
344	415	471
415	512	512

327.5

443.5

$$\textcircled{3} 700 = 0.95x + 113.04$$

$$586.96 = 0.95x$$

$$617.85 = x$$

d) For the following data:

- 1) determine the equation of the Mayer line.
- 2) predict the value of y when x = 50
- 3) predict the value of x when y = 100

x	2	3	7	8	4	12	6	9	11	15	17	1
y	13	16	29	32	15	45	27	35	47	52	54	12

x	1	2	3	4	6	7	8	9	11	12	15	17
y	12	13	16	15	27	29	32	35	47	45	52	54

MEAN!!

$$\bar{x}_1 = \frac{23}{6} = 3.83$$

$$\bar{y}_1 = \frac{112}{6} = 18.67$$

$$\bar{x}_2 = \frac{72}{6} = 12$$

$$\bar{y}_2 = \frac{265}{6} = 44.17$$

$$a = \frac{\bar{y}_2 - \bar{y}_1}{\bar{x}_2 - \bar{x}_1} = \frac{44.17 - 18.67}{12 - 3.83} = \frac{25.5}{8.17} = 3.12$$

$$\textcircled{2} \quad y = 3.12(50) + 6.71 = 162.71$$

$$\textcircled{3} \quad 100 = 3.12x + 6.71 \quad 93.29 = x$$

$$\bar{x} = \frac{3.83 + 12}{2} = 7.92$$

$$\bar{y} = \frac{18.67 + 44.17}{2} = 31.42$$

$$\bar{y} = a\bar{x} + b$$

$$31.42 = 3.12(7.92) + b$$

e) For the following data:

- 1) determine the equation of the mayer line.
- 2) predict the value of y when x = 100
- 3) predict the value of x when y = 100

x	22	13	27	88	34	12	16	19
y	13	16	29	32	15	45	27	35

x	12	13	16	19	22	27	34	88
y	45	16	27	35	13	29	15	32

$$\bar{x}_1 = \frac{60}{4} = 15$$

$$\bar{y}_1 = \frac{123}{4} = 30.75$$

$$\bar{x}_2 = \frac{171}{4} = 42.75$$

$$\bar{y}_2 = \frac{89}{4} = 22.25$$

$$\bar{x} = 28.88$$

$$\bar{y} = 26.5$$

$$a = \frac{22.25 - 30.75}{42.75 - 15}$$

$$= \frac{-8.5}{27.75}$$

$$= -0.31$$

$$\textcircled{2} \quad y = -0.31(100) + 35.45$$

$$y = 4.45$$

$$\textcircled{3} \quad 100 = -0.31x + 35.45$$

$$-208.23 = x$$

$$\bar{y} = a\bar{x} + b$$

$$26.5 = -0.31(28.88) + b$$

$$35.45 = b$$

$$\textcircled{1} \quad y = -0.31x + 35.45$$

f) For the following data:

- 1) determine the equation of the mayer line.
- 2) predict the value of y when x = 500
- 3) predict the value of x when y = 700

x	102	300	227	248	344	212	226	119	311	415
y	138	416	290	332	415	345	270	235	471	512

x	102	119	212	226	227	248	300	311	344	415
y	138	235	345	270	290	332	416	471	415	512

$$\bar{x}_1 = \frac{336}{5}$$

$$= 177.2$$

$$\bar{y}_1 = \frac{1278}{5}$$

$$= 255.6$$

$$\bar{x}_2 = \frac{1618}{5}$$

$$= 323.6$$

$$\bar{y}_2 = \frac{2146}{5}$$

$$= 429.2$$

$$\bar{x} = 250.4$$

$$\bar{y} = 342.4$$

$$a = \frac{429.2 - 255.6}{323.6 - 177.2}$$

$$a = \frac{173.6}{146.4}$$

$$a = 1.19$$

$$\bar{y} = a\bar{x} + b$$

$$342.4 = 1.19(250.4) + b$$

$$44.42 = b$$

$$1) \quad y = 1.19x + 44.42$$

$$2) \quad y = 1.19(500) + 44.42$$

$$y = 639.42$$

$$3) \quad 700 = 1.19x + 44.42$$

$$655.58 = 1.19x$$

$$550.91 = x$$