

Regression Line (Part II: Mayer Line)

Goal:

- to be able to determine the equation of a line of best fit using the "Mayer Line Method"

Using the same data as last class:

| x | y |
|-----|------|
| 2 | 13 |
| 2.5 | 14 |
| 3 | 15.5 |
| 3.5 | 17 |
| 4 | 18 |
| 4.5 | 19 |
| 5 | 20.5 |
| 5.5 | 22 |
| 6 | 23 |
| 6.5 | 24 |

$$\bar{x}_1 = \frac{2+2.5+3+3.5+4}{5} = 3$$

$$\bar{y}_1 = \frac{13+14+15.5+17+18}{5} = 15.5$$

$$P_1 (3, 15.5)$$

$$\bar{x}_2 = \frac{4.5+5+5.5+6+6.5}{5} = 5.5$$

$$\bar{y}_2 = \frac{19+20.5+22+23+24}{5} = 21.7$$

$$P_2 (5.5, 21.7)$$

Mayer Line Method:

1. Place ordered pairs in ascending values of x . (Same as med-med line)

2. Divide into two equal groups.

3. Find \bar{x} (mean) and \bar{y} (mean) for each group. These are then P_1 and P_2 which are located on "Mayer line".

4. Find equation ($y = ax + b$) using P_1 and P_2 .

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{21.7 - 15.5}{5.5 - 3} = \frac{6.2}{2.5} = 2.48$$

$$y = 2.48x + b$$

$$P_1(3, 15.5) \quad 15.5 = 2.48(3) + b$$

$$15.5 = 7.44 + b$$

$$-7.44 \quad -7.44$$

$$7.56 = b$$

$$y = 2.48x + 7.56$$

Comparing the three methods:

Eyeball: $y = 2.6x + 7.3$
fastest
least reliable

Median-median line: $y = 2.57x + 7.58$
most accurate
can always use

Mayer line: $y = 2.48x + 7.56$
- only use
when even # of ordered pairs
medium fast, medium reliability

p.114

Group 1

#6.9 | (13, ⁴70) (13, ³20) (13, ⁵65) (13, ⁴84) (13, ⁴26)
 (¹14, 17) (14, 78) (14, ²17) (14, 78) (14, 120)
 (14, 120) |²³
 10 values 11 values

Med x_1 : 14

med y_1 : ~~17~~

y -values must be in order to find median

$M_1(x_1, y_1)$

$M_2(x_2, y_2)$

$M_3(x_3, y_3)$

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

$$P\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$$

↑
plug into $y = ax + b$

Homework: p. 115 # 8, 11

