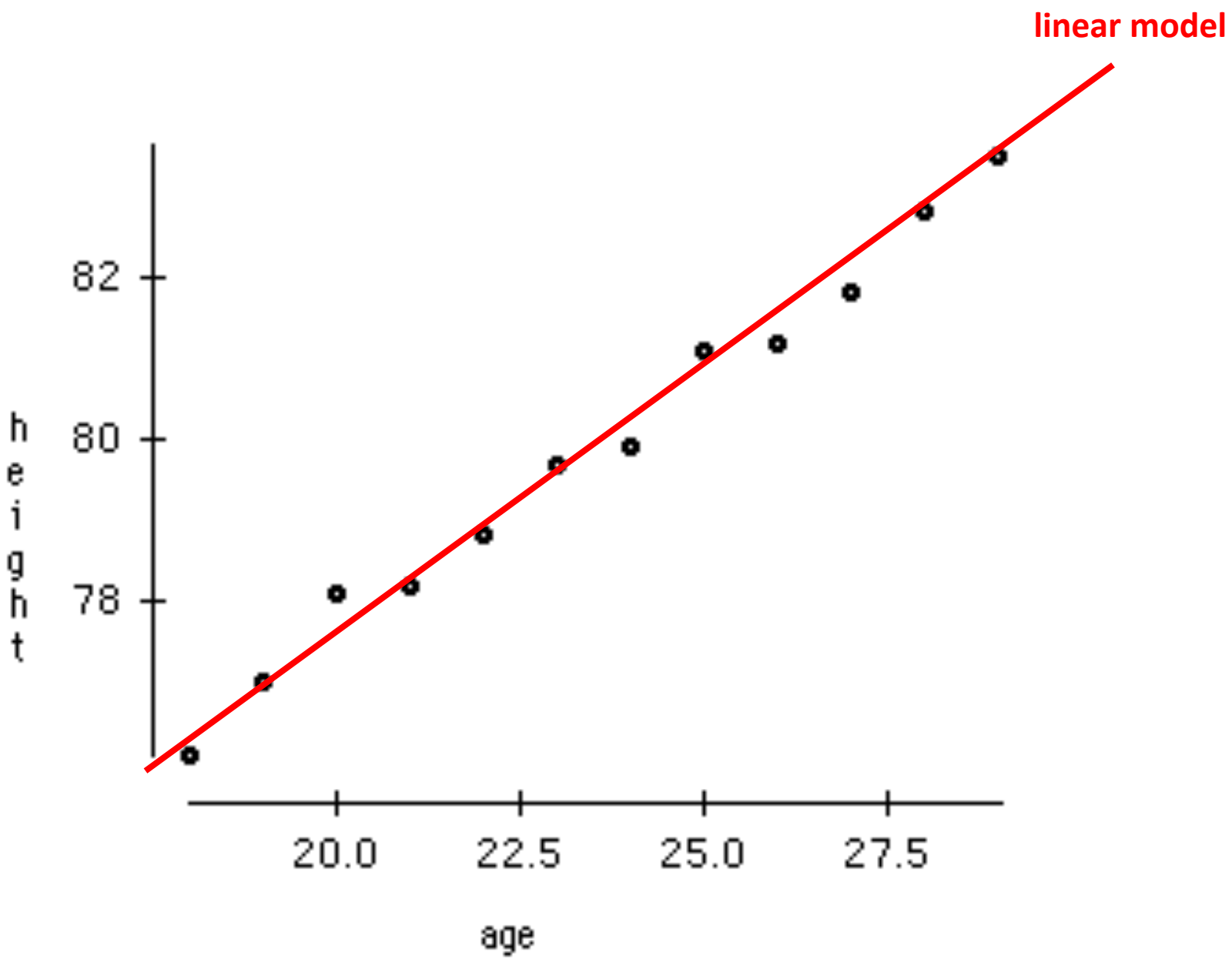
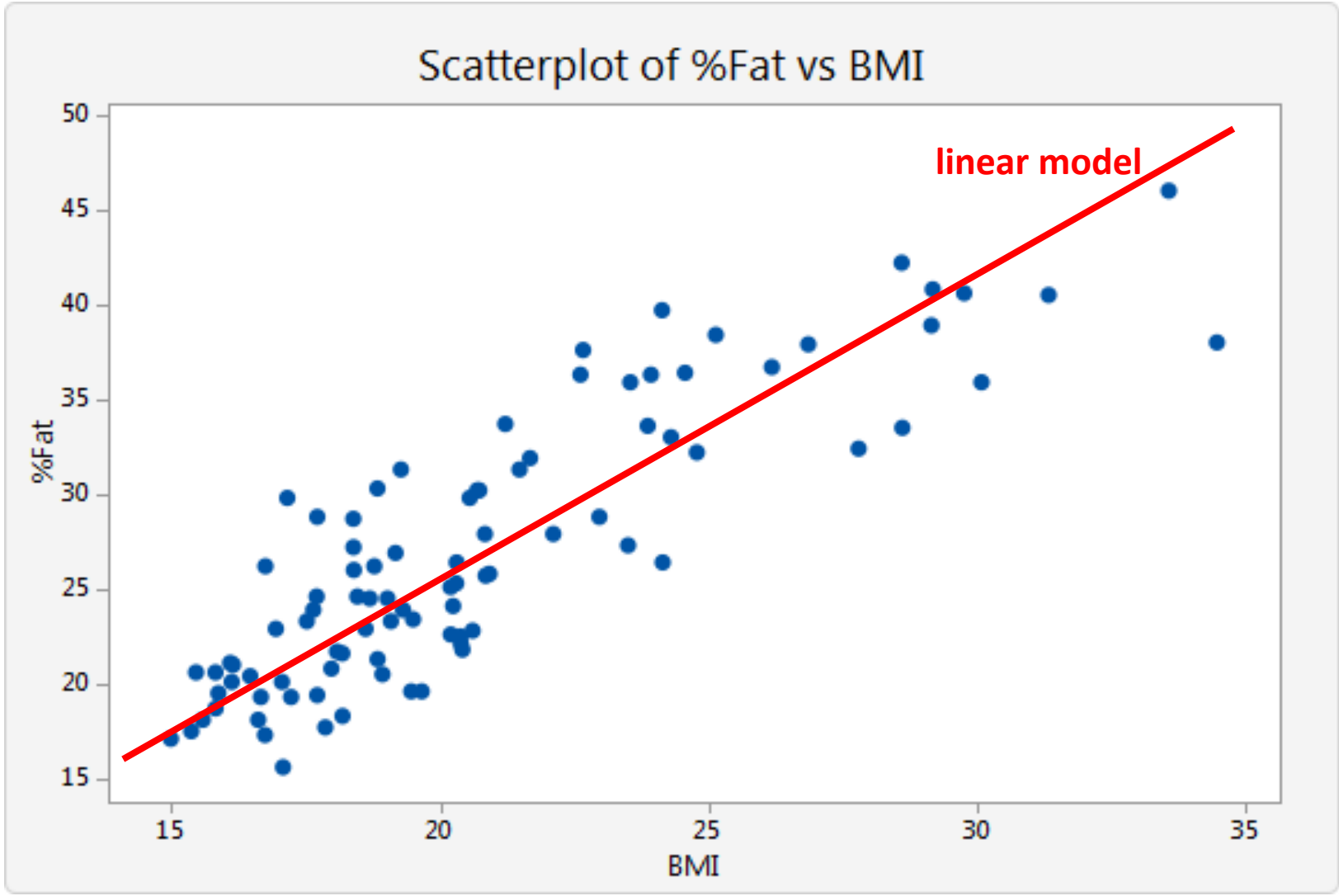
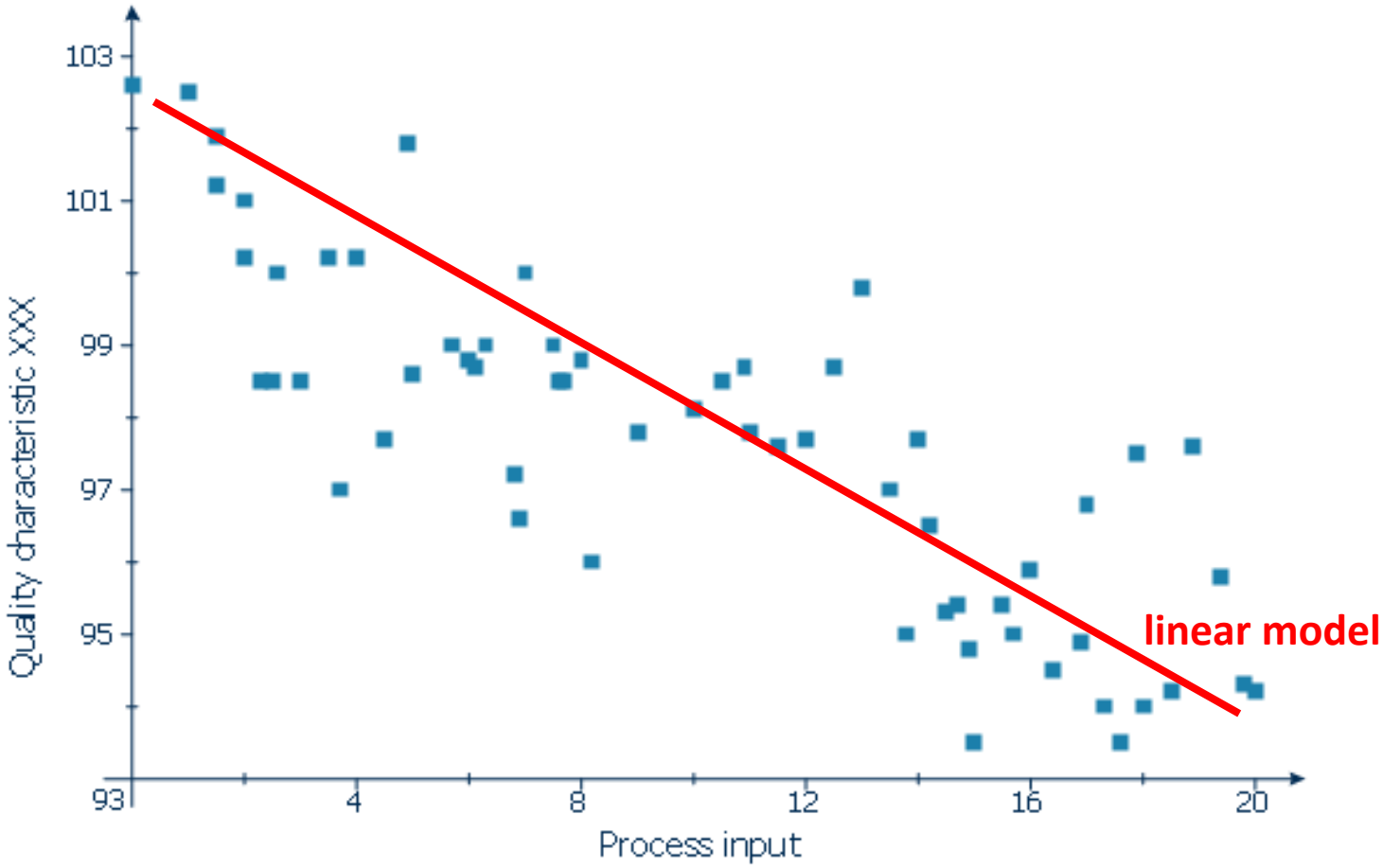
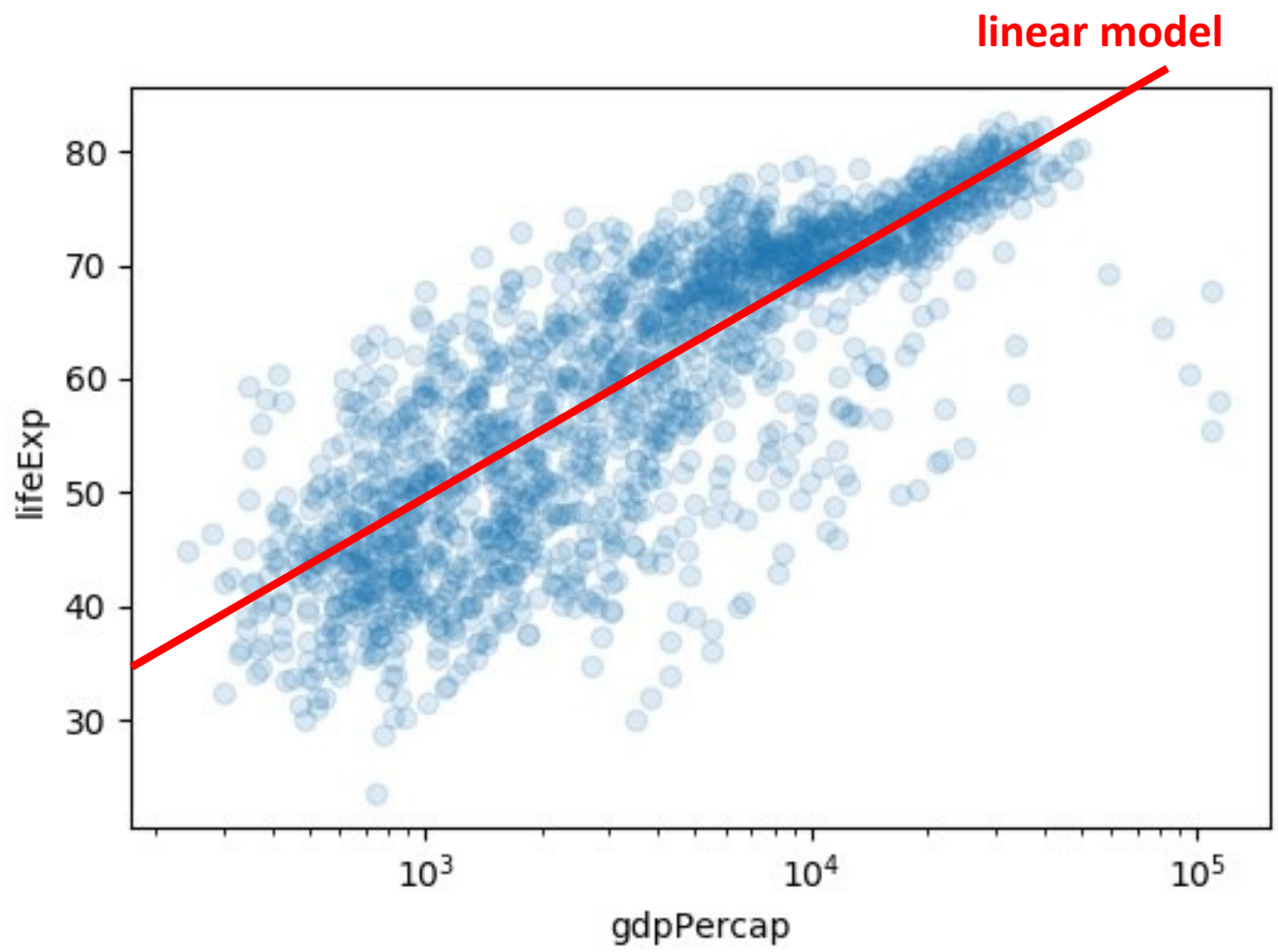
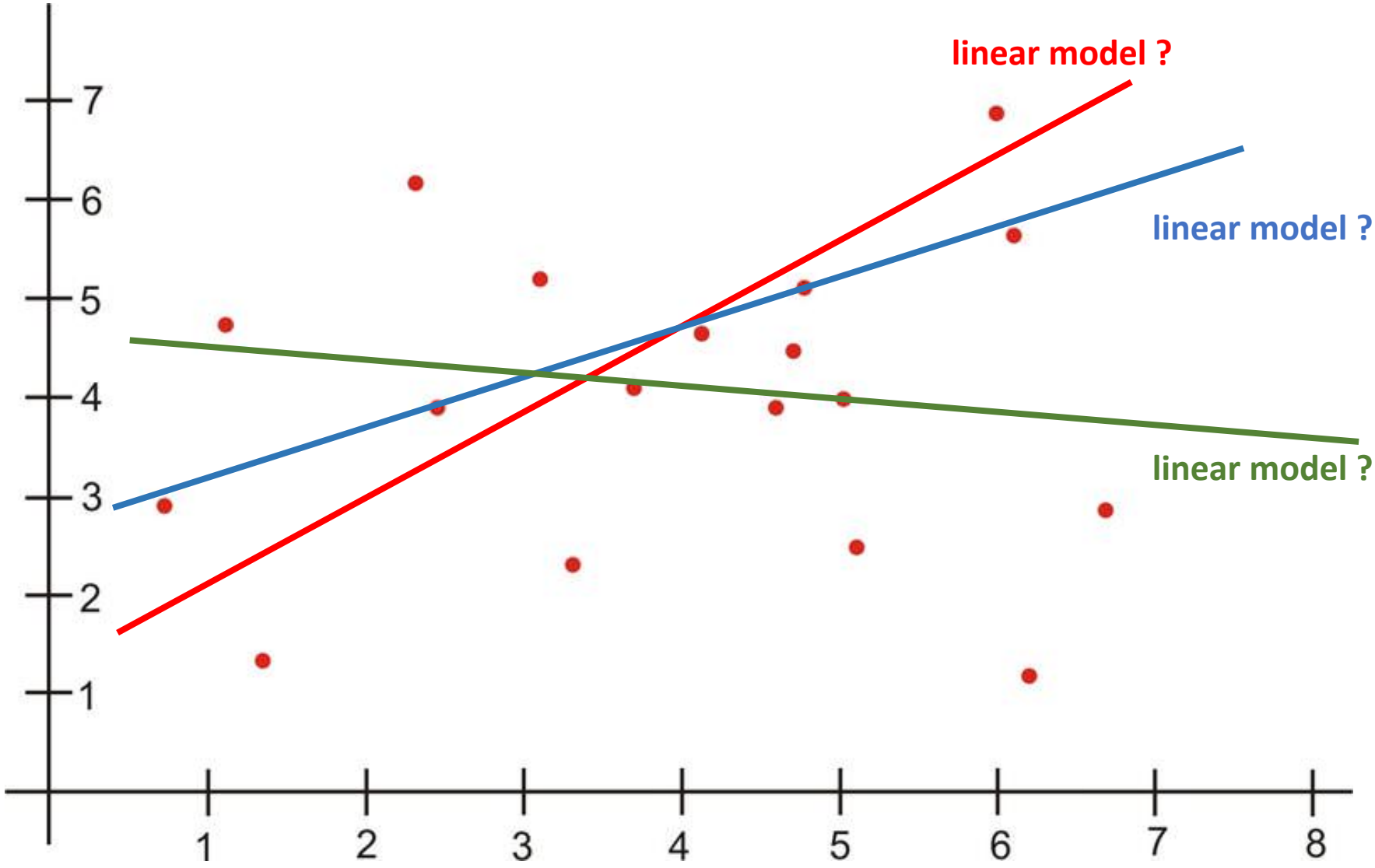
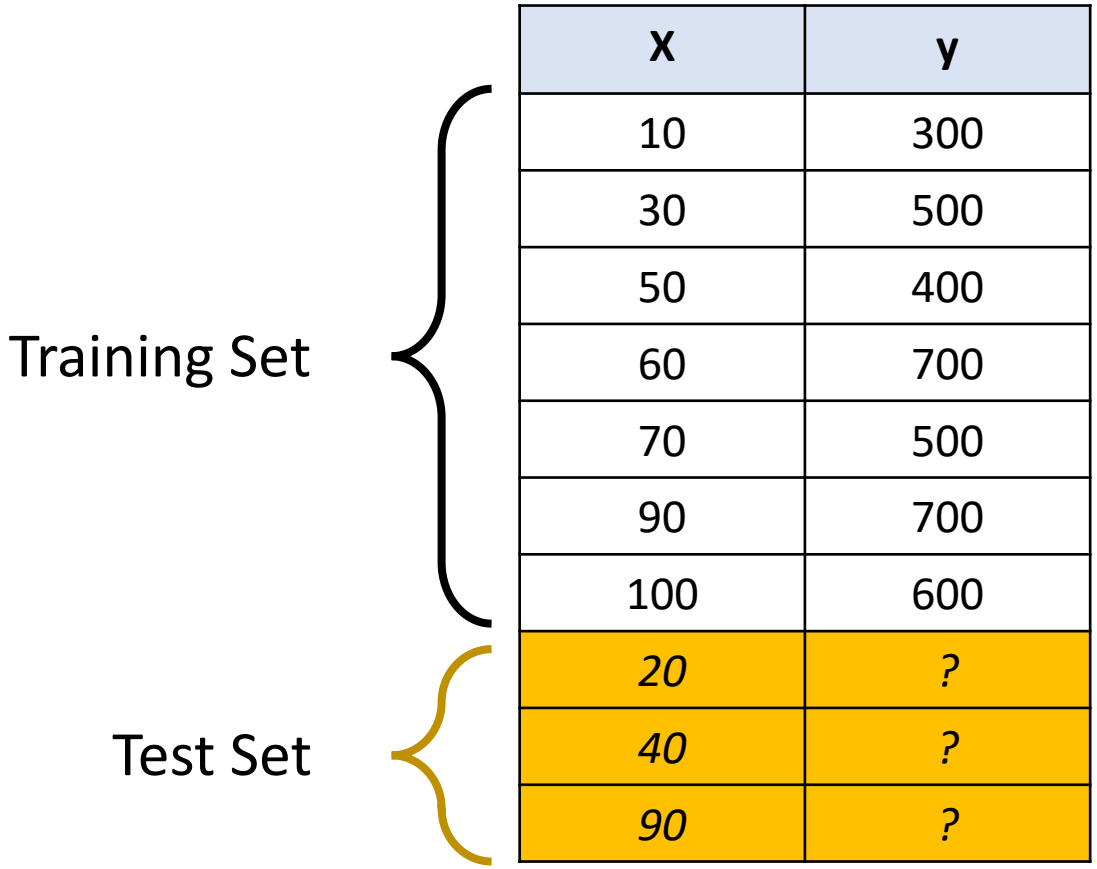

linear model
82
80
78
height
20.0
22.5
25.0
27.5
age


Scatterplot of %Fat vs BMI
linear model
%Fat
BMI
50
45
40
35
30
25
20
15
15
20
25
30
35

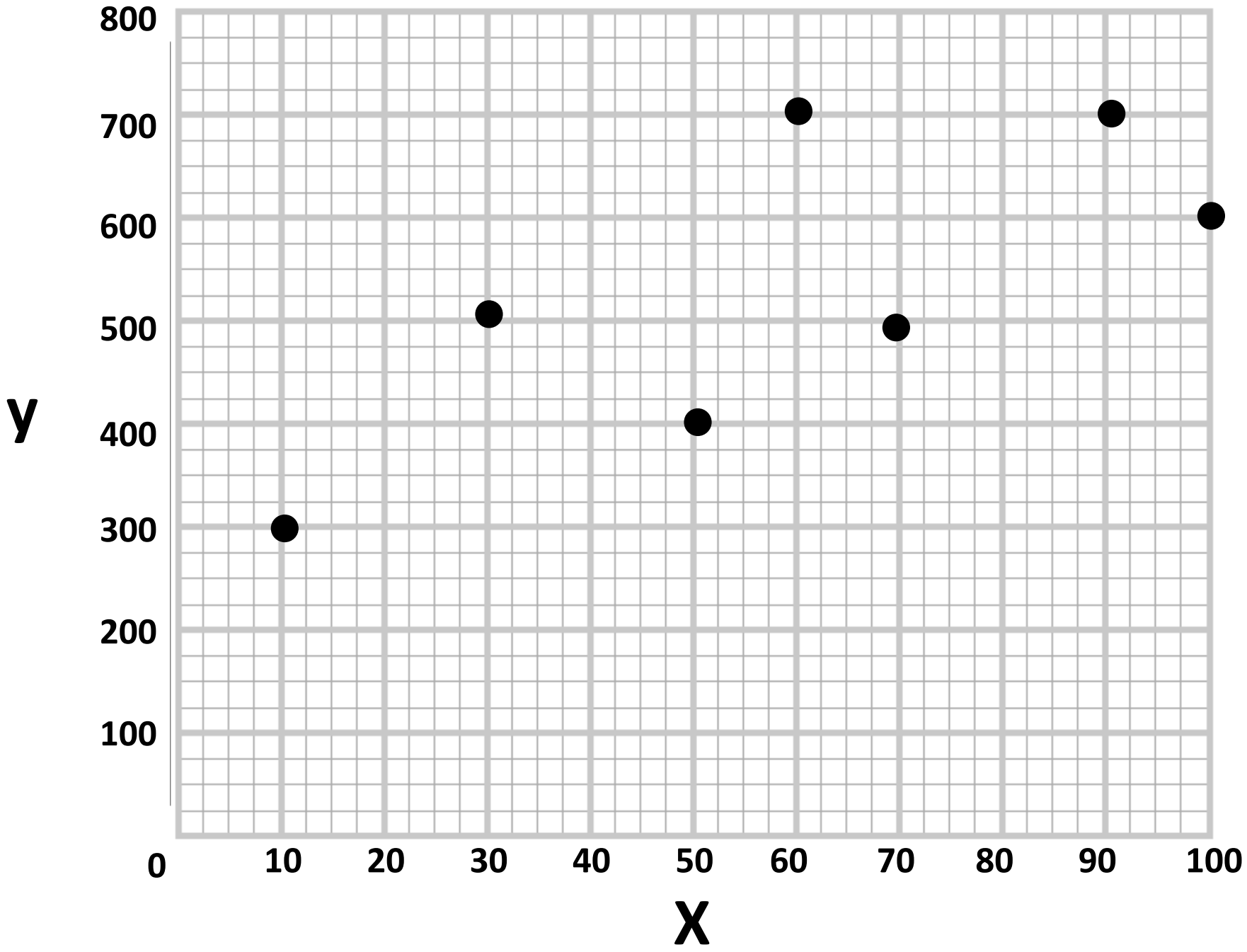

103
101
99
97
95
93
4
8
12
16
20
Quality characteristic XXX
Process input
linear model

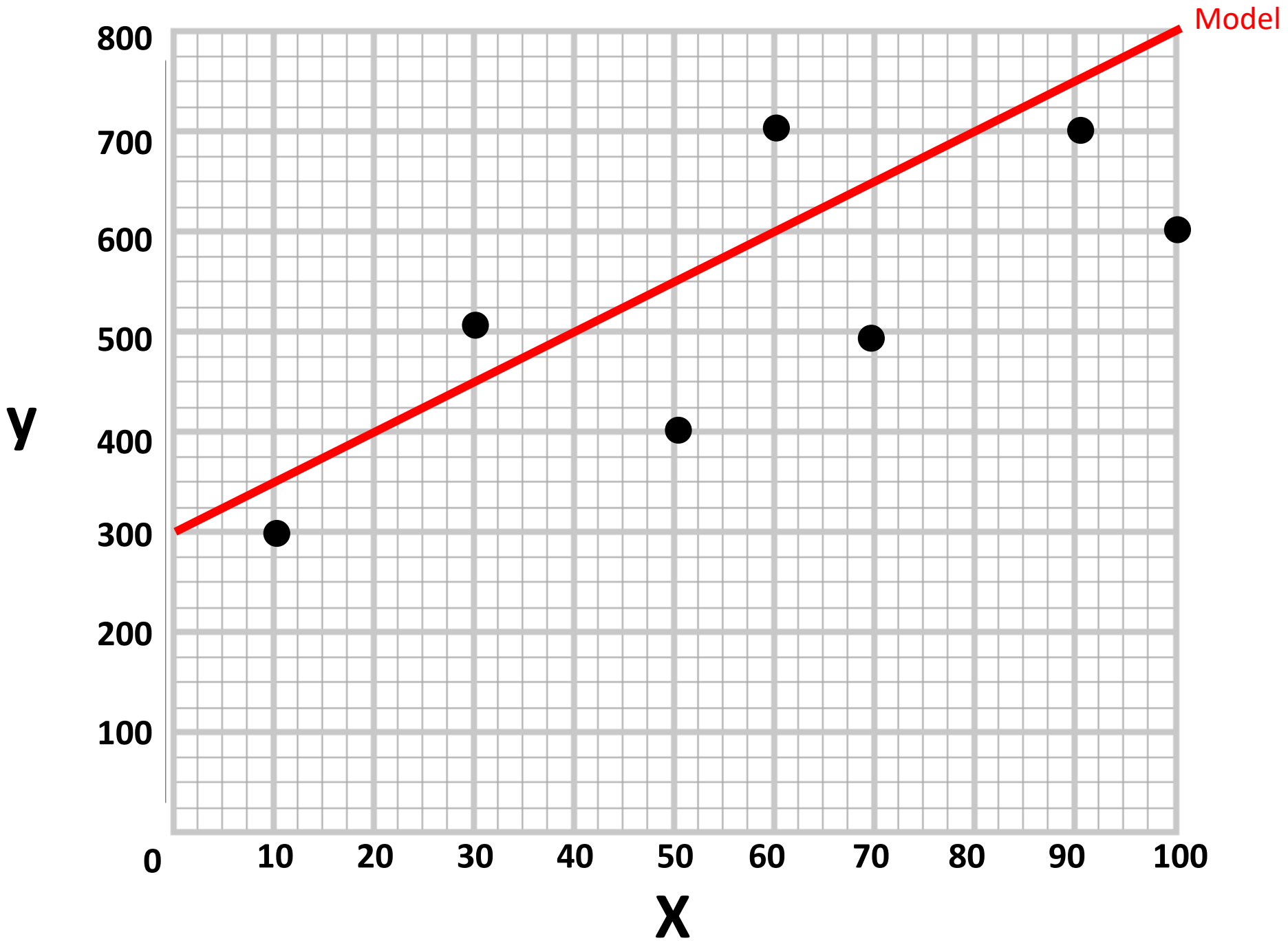

linear model
80
70
60
50
40
30
lifeExp
10^3
10^4
10^5
gdpPercap

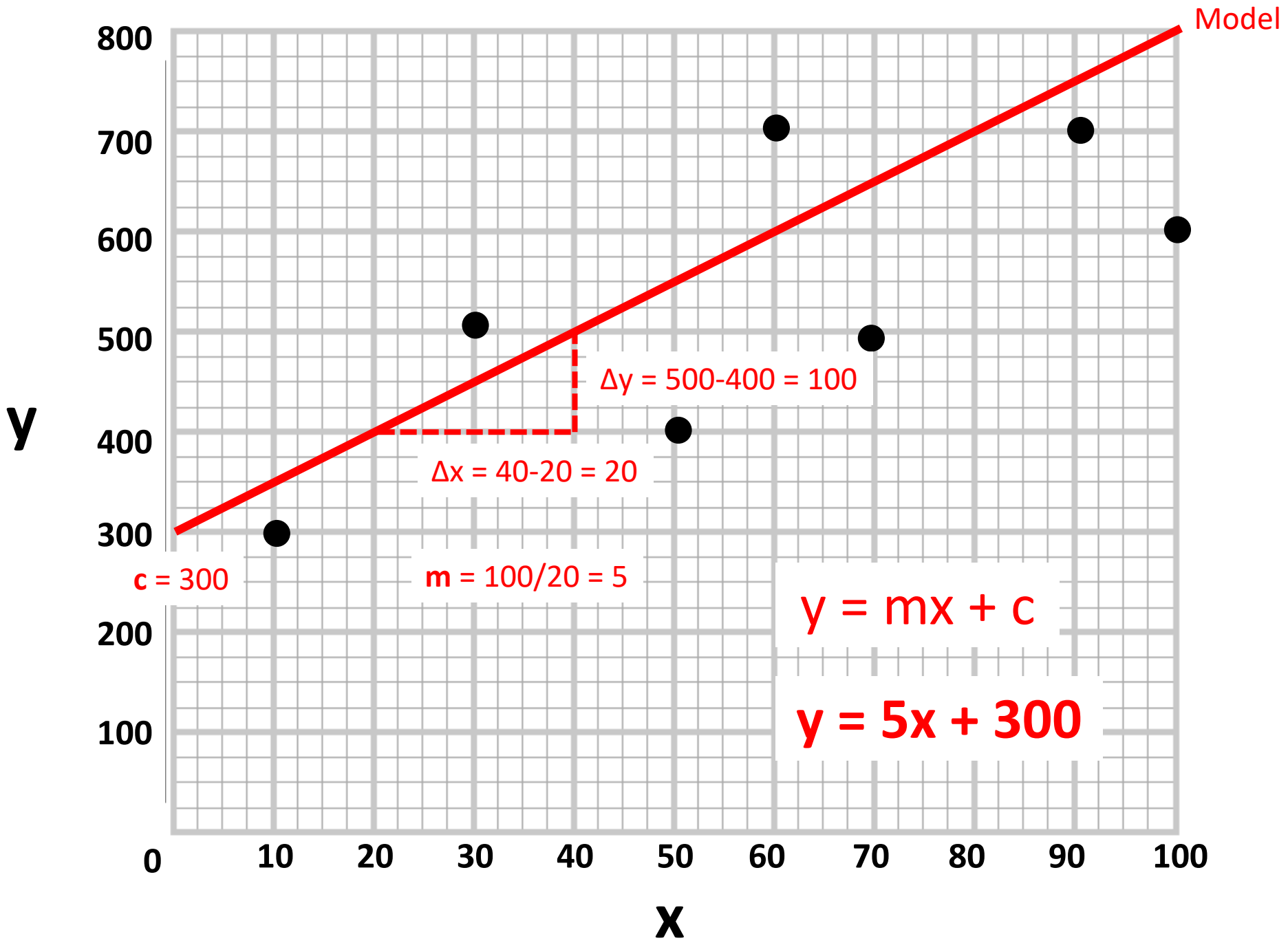

linear model ?
linear model ?
linear model ?
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8

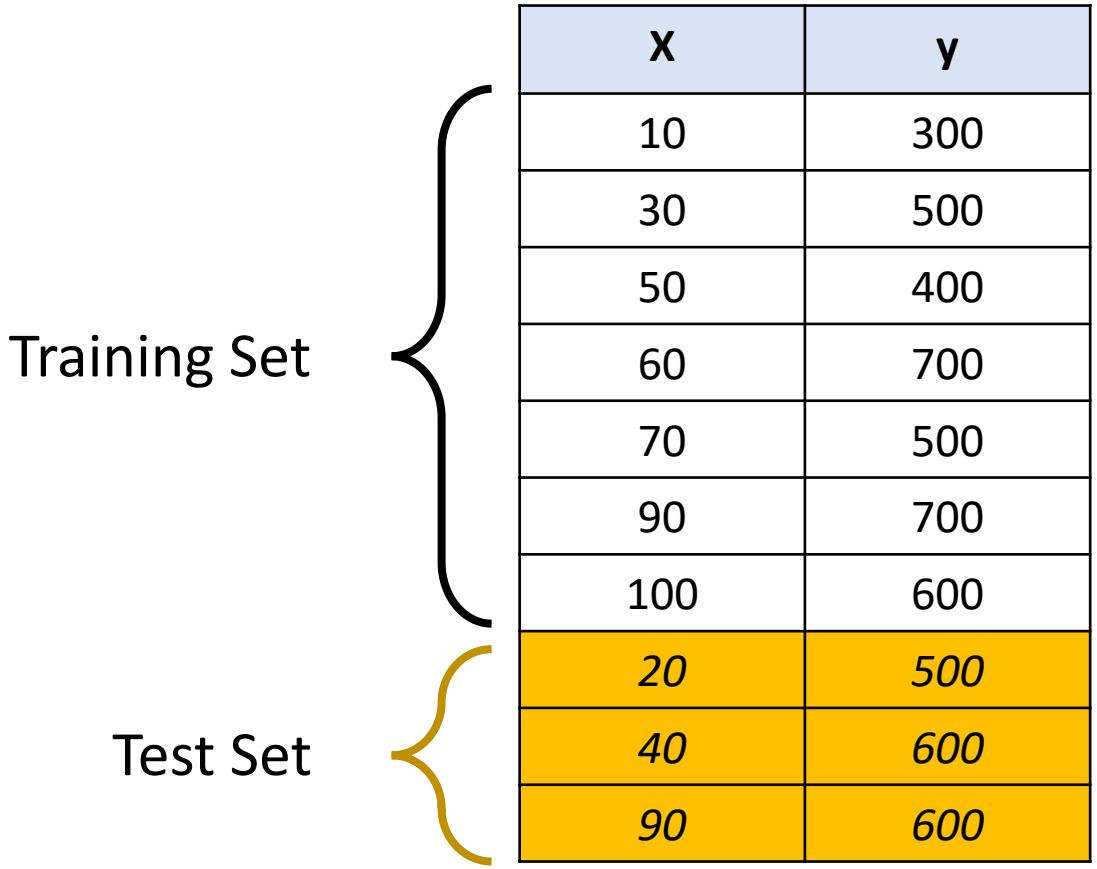


x	y
10	300
30	500
50	400
60	700
70	500
90	700
100	600
20	*?*
40	*?*
90	*?*

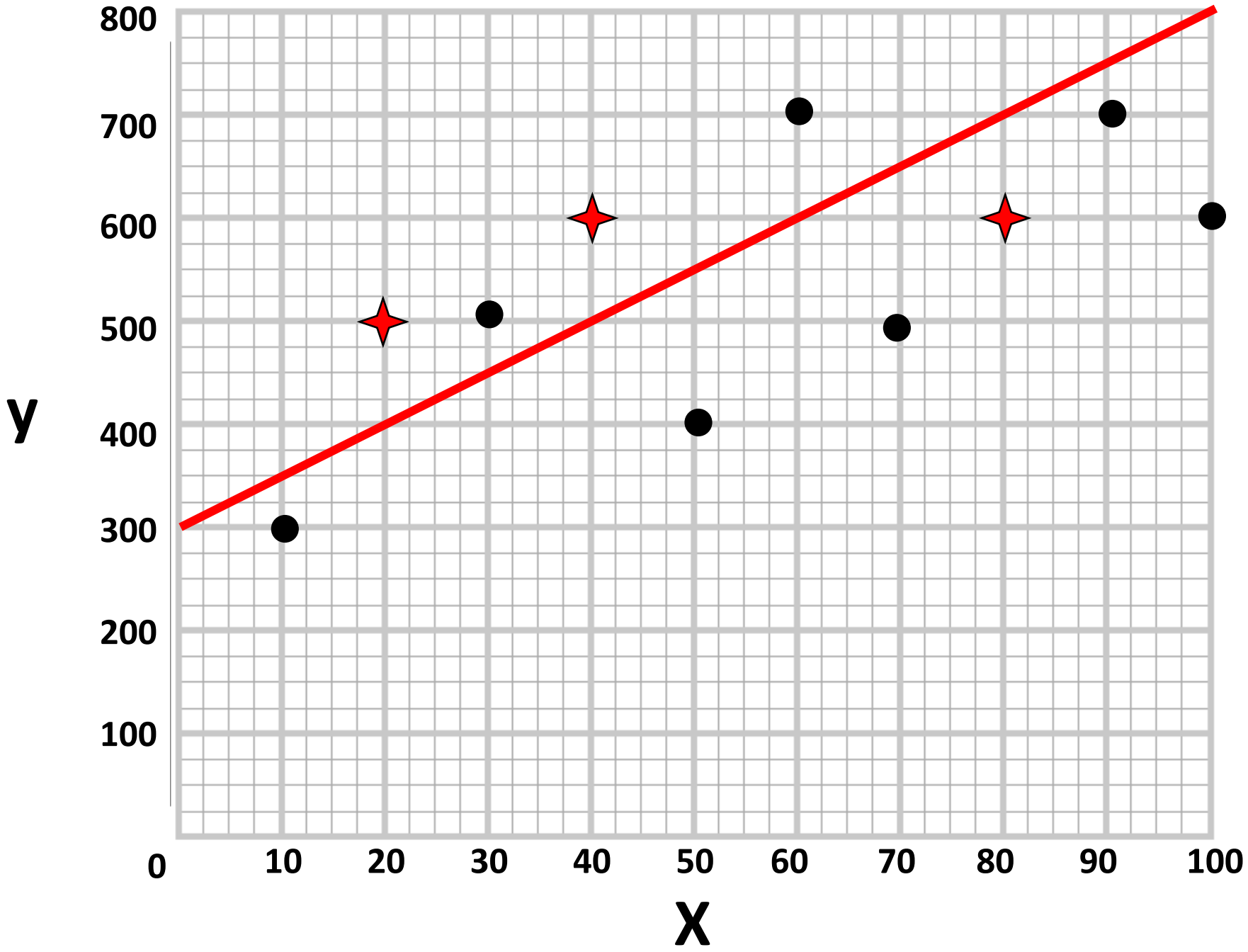

800
700
600
500
400
300
200
100
y
0
10
20
30
40
50
60
70
80
90
100
X


Model
800
700
600
500
400
300
200
100
y
0
10
20
30
40
50
60
70
80
90
100
X


Model
800
700
600
500
400
300
200
100
0
10
20
30
40
50
60
70
80
90
100
y
x
Δy = 500-400 = 100
Δx = 40-20 = 20
c = 300
m = 100/20 = 5
y = mx + c
y = 5x + 300



x	y
10	300
30	500
50	400
60	700
70	500
90	700
100	600
20	*500*
40	*600*
90	*600*


800
700
600
500
400
300
200
100
y
0
10
20
30
40
50
60
70
80
90
100
X

$y = 5x + 300$

X	y	y_pred	y – y_pred	| y – y_pred |	$(y - y\_pred)^2$
20	500				
40	600				
90	600				

$y = 5x + 300$

X	y	y_pred	y – y_pred	| y – y_pred |	$(y - y\_pred)^2$
20	500	5*20 + 300 = 400	100	100	10,000
40	600	5*40 + 300 = 500	100	100	10,000
90	600	5*90 + 300 = 750	-150	150	22,500

y = 5x + 300

X	y	y_pred	y – y_pred	| y – y_pred |	$(y - y\_pred)^2$
20	500	5*20 + 300 = 400	100	100	10,000
40	600	5*40 + 300 = 500	100	100	10,000
90	600	5*90 + 300 = 750	-150	150	22,500

$$RMSE = \sqrt{\frac{\sum_{i=1}^{n}(y_{pred,i} - y_i)^2}{n}}$$

y = 5x + 300

X	y	y_pred	y – y_pred	| y – y_pred |	$(y - y\_pred)^2$
20	500	5*20 + 300 = 400	100	100	10,000
40	600	5*40 + 300 = 500	100	100	10,000
90	600	5*90 + 300 = 750	-150	150	22,500

$$\text{MAPE} = \frac{100\%}{N} \sum_{i=1}^{N} \left| \frac{y_i - \hat{y}_i}{y_i} \right|$$

y = 5x + 300

X	y	y_pred	y – y_pred	| y – y_pred |	$(y - y\_pred)^2$
20	500	5*20 + 300 = 400	100	100	10,000
40	600	5*40 + 300 = 500	100	100	10,000
90	600	5*90 + 300 = 750	-150	150	22,500

$$\text{MAE} = \frac{1}{n}\sum_{j=1}^{n}|y_j - \hat{y}_j|$$