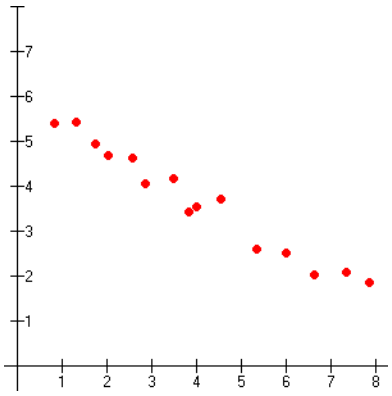
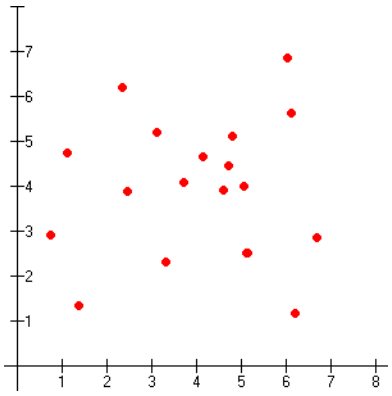
Scatterplot and Line of Best Fit Notes

Scatterplot : a graph that relates two sets of data, where the x-coordinate is the **independent** variable and the y-coordinate is the **dependent** variable

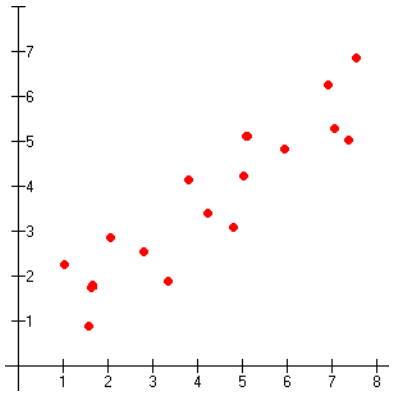
Types of Correlations:



Negative Correlation



No Correlation

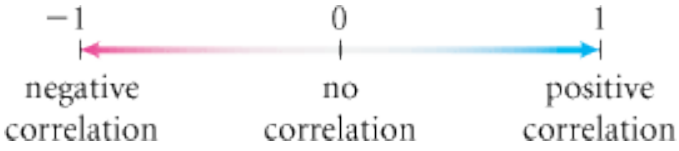


Positive Correlation

The trend line that shows the relationship between two sets of data most accurately is called the **line of best fit**.

A graphing calculator computes the equation of a line of best fit using a method called **linear regression**.

The graphing calculator also gives you the **correlation coefficient**, *r*, which tells you how closely the equation models the data.

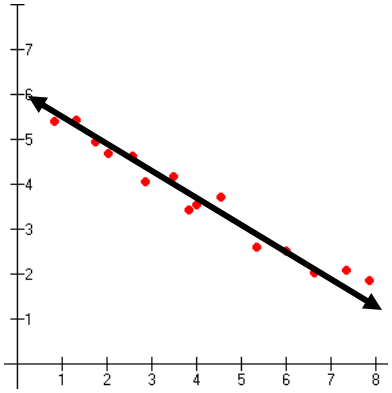


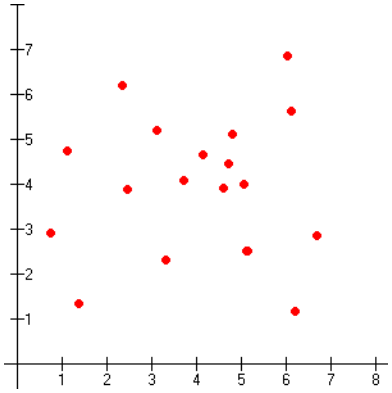
When the data points cluster around a line, there is a strong correlation between the line and the data. So the nearer *r* is to 1 or −1, the more closely the data cluster around the line of best fit.

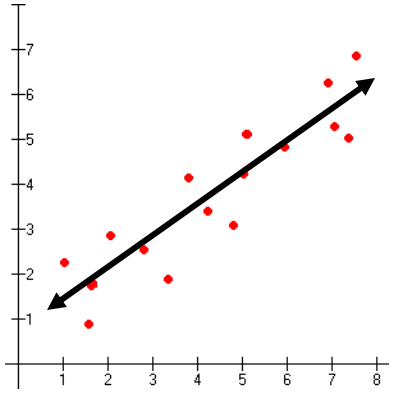
Line of Best Fit Examples

Draw the line of best fit

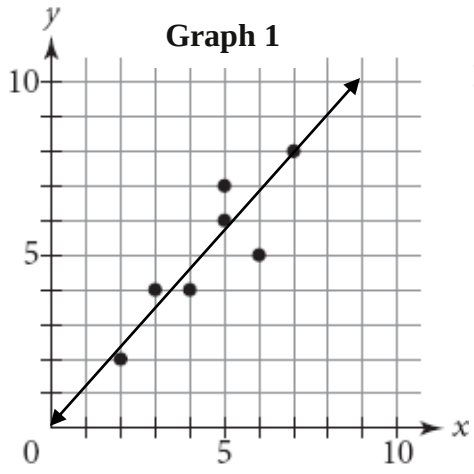
Answers may vary, but the equations of the lines should be fairly close to what is listed.

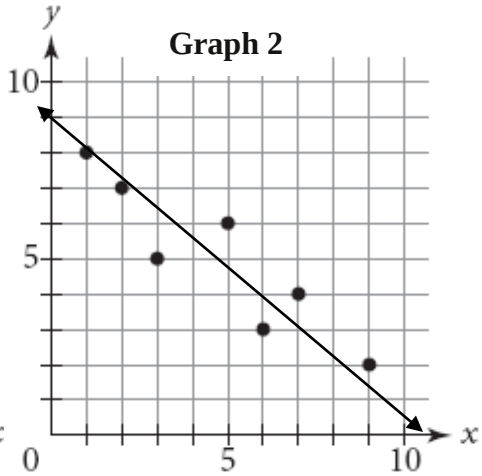


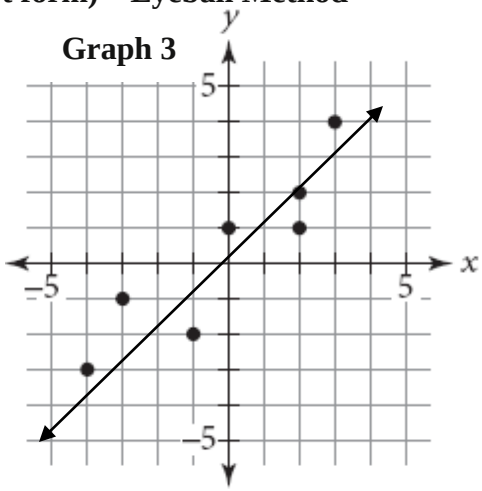




Draw the line of best and write the equation of the line (slope-intercept form) – Eyeball Method





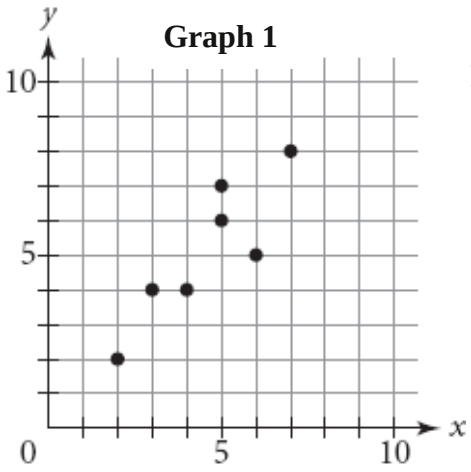


a.) Draw the line of best fit, showing the general trend of the line
b.) Choose two points on the line of best fit, the points may not necessarily be a data point
c.) Find the slope using those two points
d.) Use the slope and one of the points to substitute into y = mx + b
e.) Solve for b.
f.) Write the equation of the line in slope-intercept form by substituting m and b into y = mx + b

Graph 1	Graph 2	Graph 3
b.) **(7, 8) (0, 0)**	b.) **(0, 8) (6, 4)**	b.) **(-4.5, -4.5) (0, 0.5)**
c.) **8/7**	c.) **-2/3**	c.) **1**
d.) **0 = 8/7(0) + b**	d.) **4 = -2/3(6) + b**	d.) **-4.5 = 1(-4.5) + b**
e.) **b = 0**	e.) **b = 8**	e.) **b = 0**
f.) **y = 8/7x**	f.) **y = -2/3x + 8**	f.) **y = x**

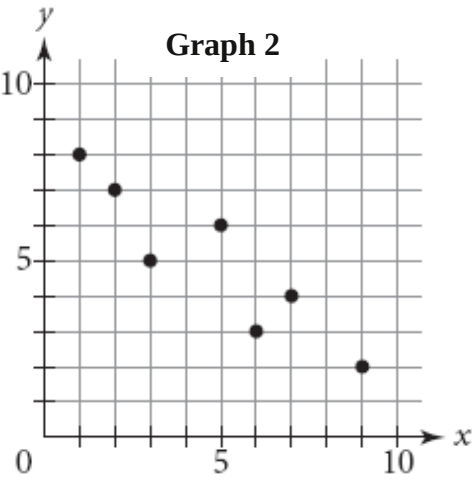
Draw the line of best and write the equation of the line (slope-intercept form) – X_{mean}, Y_{mean} Method

Graph 1



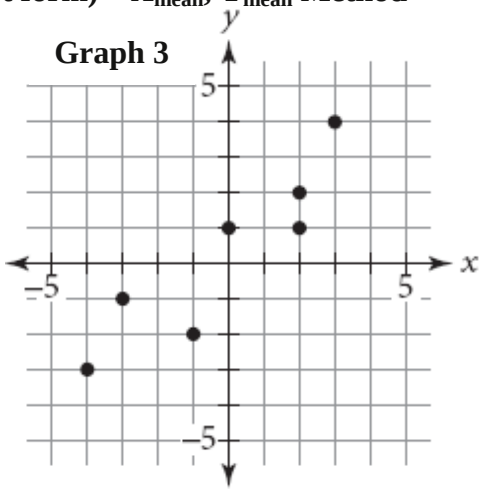
X	Y
2	2
3	4
4	4
5	6
5	7
6	5
7	8

Graph 2



X	Y
1	8
2	7
3	5
5	6
6	3
7	4
9	2

Graph 3



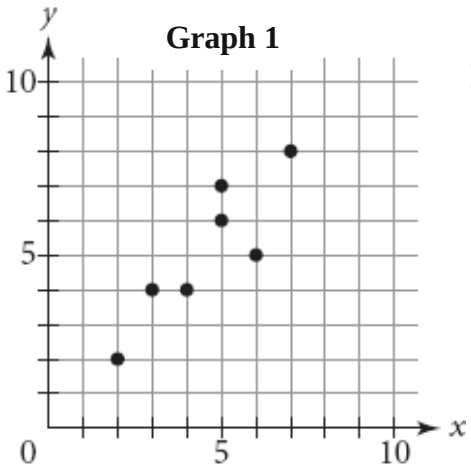
X	Y
-4	-3
-3	-1
-1	-2
0	1
2	1
2	2
3	4

a.) Calculate the X_{mean}, Y_{mean} point (mark with an X on the graph) **Rounded to the nearest tenth.**
b.) Draw the line of best fit, showing the general trend of the line, making sure the line passes through X_{mean}, Y_{mean} point
c.) Choose one point on the line of best fit, the points may not necessarily be a data point, and the X_{mean}, Y_{mean}
d.) Find the slope using those two points
e.) Use the slope and one of the points to substitute into y = mx + b
f.) Solve for b.
g.) Write the equation of the line in slope-intercept form by substituting m and b into y = mx + b

Graph 1	Graph 2	Graph 3
a.) **(4.6, 5.1)**	a.) **(4.7, 5)**	a.) **(0, 0.3)**
c.) **(4.6, 5.1) (8, 9)**	c.) **(4.7, 5) (2, 7)**	c.) **(0, 0.3) (3, 2.5)**
d.) **1.1**	d.) **-0.7**	d.) **0.7**
e.) **5.1 = 1.1 (4.6) + b**	e.) **5 = -0.7(4.7) + b**	e.) **0.3 = 0.7(0) + b**
f.) **b = 0.04**	f.) **b = 8.29**	f.) **b = 0.3**
g.) **y = 1.1x + 0.4**	g.) **y = -0.7x + 8.29**	g.) **y = 0.7x + 0.3**

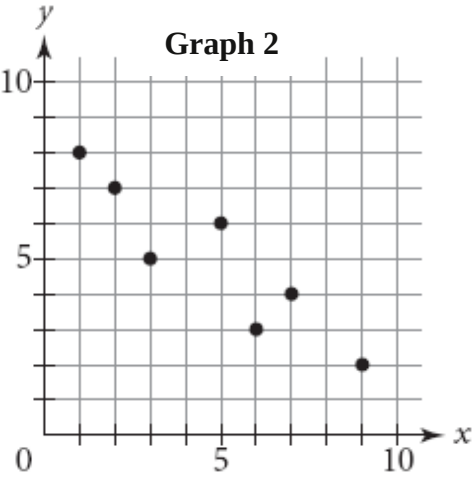
Draw the line of best and write the equation of the line (slope-intercept form) – Q-Points Method

Graph 1



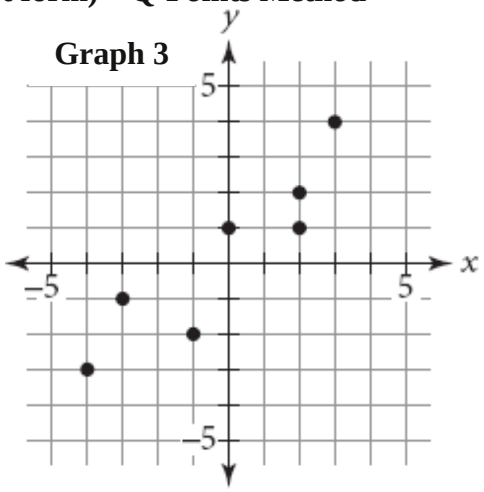
X	Y
2	2
3	4
4	4
5	6
5	7
6	5
7	8

Graph 2



X	Y
1	8
2	7
3	5
5	6
6	3
7	4
9	2

Graph 3



X	Y
-4	-3
-3	-1
-1	-2
0	1
2	1
2	2
3	4

a.) Calculate the 1st and 3rd Quartiles of the x- and y-coordinates

b.) Use the 1st and 3rd Quartiles to write **Q-Points**

Positive Correlation

(Q1 of x-coordinates, Q1 of y-coordinates)

(Q3 of x-coordinates, Q3 of y-coordinates)

Negative Correlation

(Q1 of x-coordinates, Q3 of y-coordinates)

(Q3 of x-coordinates, Q1 of y-coordinates)

c.) Mark appropriate Q-Points with X's on the graph

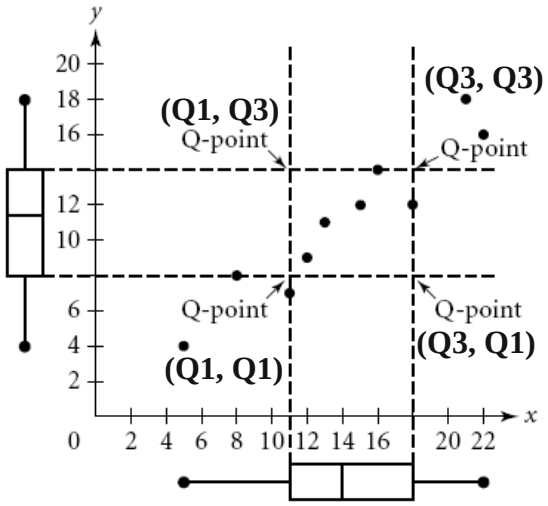
d.) Draw the line of best fit passing through the Q-Points

e.) Find the slope using Q-Points

f.) Use the slope and one of the Q-Points to substitute into y = mx + b

g.) Solve for b.

h.) Write the equation of the line in slope-intercept form by substituting m and b into y = mx + b



Graph 1			Graph 2			Graph 3		
a.)	Q1 (x) **3**	Q3 (x) **6**	a.)	Q1 (x) **2**	Q3 (x) **7**	a.)	Q1 (x) **-3**	Q3 (x) **2**
	Q1 (y) **4**	Q3 (y) **7**		Q1 (y) **3**	Q3 (y) **7**		Q1 (y) **-2**	Q3 (y) **2**
b.) **(3, 4) (6, 7)**			b.) **(2, 7) (7, 3)**			b.) **(-3, -2) (2, 2)**		
e.) **1**			e.) **-0.8**			e.) **0.8**		
f.) **4 = 1(3) + b**			f.) **7 = -0.8(2) + b**			f.) **2 = 0.8(2) + b**		
g.) **b = 0**			g.) **b = -5.4**			g.) **b = 0.4**		
h.) **y = x**			h.) **y = -0.8x + 8.6**			h.) **y = 0.8x + 0.4**		