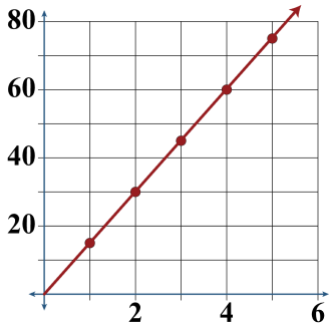
CORRELATION COEFFICIENTS AND TRENDS (MODEL NOTES)

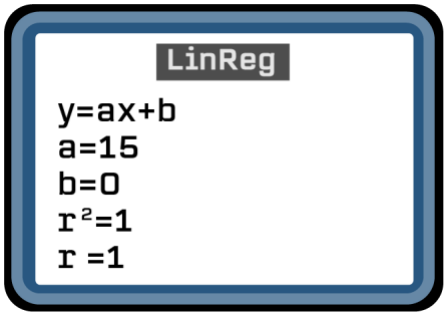
Directions

1) Sketch one single straight line that you think best fits each set of data.

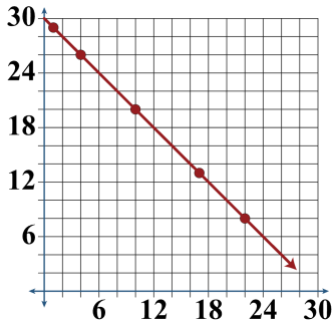
2) Highlight the values for a, b, and r (not r^2).

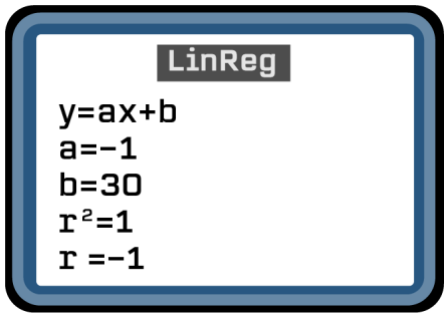
Tickets	Cost
1	$15
2	$30
3	$45
4	$60
5	$75



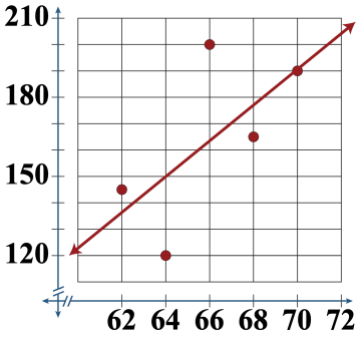


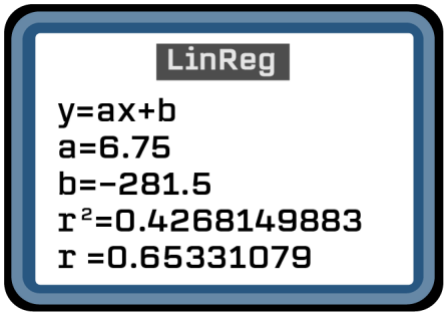
Candy Eaten	Candy Left
1	29
4	26
10	20
17	13
22	8





Height (in.)	Weight (lbs.)
62	145
64	120
66	200
68	165
70	190





Observations

How do you see ***a*** and ***b*** represented on the line you sketched?

a is the slope of the line, and b is the y-intercept.

Compare the ***r***-values of each data set. What do you think ***r*** represents?

r represents how well the data fits the line.

Linear Regression (Formalize Your Findings)

Your calculator uses ***linear regression*** to find a line of best fit, which is also known as a ***linear regression model***.

- ***a*** represents the __*slope*__ of the line.
- ***b*** represents the __*y-intercept*__ of the line.
- ***r*** is the ***correlation coefficient***. This r-value shows __*how well the linear regression model fits the data*__.
- The closer the r-value is to __-1__ or __1__, the better the line fits the data.

Linear or Exponential

- If a scatter plot **<u>can</u>** be represented with a straight line, then we say that the trend is __*linear*__.
- If a scatter plot **<u>cannot</u>** be represented with a straight line, then we say that the trend is __*nonlinear*__.
- When a data set is ***linear***, the y-values change by __*adding the same number*__.
- When a data set is ***exponential***, the y-values change by __*multiplying by the same number*__.

Week	Account Balance
1	$4.00
2	$8.00
3	$12.00
4	$16.00
5	$20.00

Example

You are saving money to buy a video game. The table shows your account balance at the end of each week. Is the data linear or not linear? How can you tell from the table?

The data is linear because $4 is added to the account balance every week.

Find the linear regression model for your account balance and write it in the form $y = mx + b$.

$y = 4x + 0$ or $y = 4x$

Give the correlation coefficient and explain its meaning.

$r = 1$. This means that the linear regression model perfectly fits the given data.

Predict the amount of money in your account after 10 weeks.

$y = 4(10) + 0 = 40 + 0 = 40$ *After 10 weeks, I should have $40.*