

Chapter 4

Writing Linear Equations



4.1

Write Linear Equations in Slope- Intercept Form

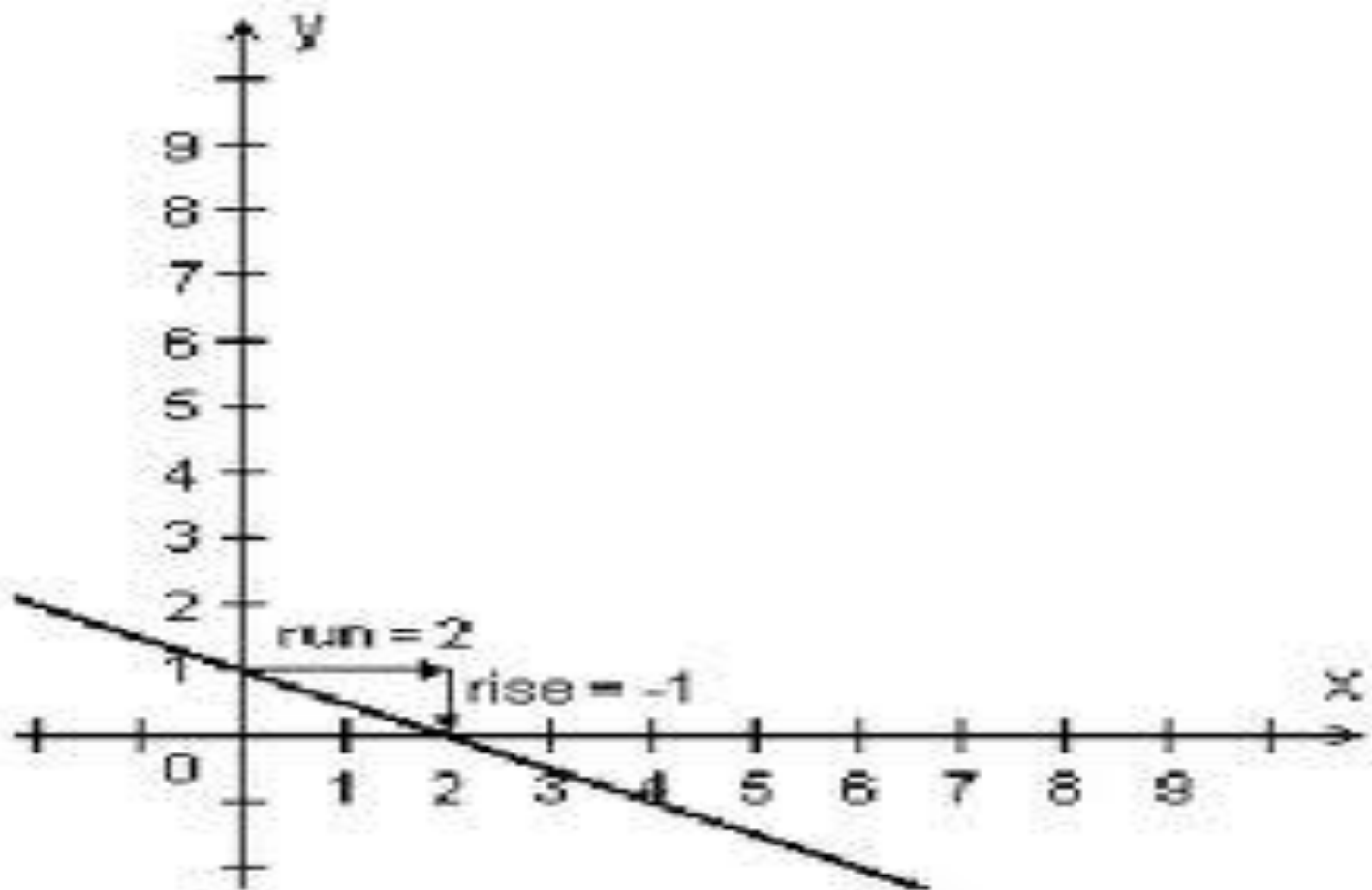


Slope-Intercept Form

- ∞ _____ with _____ and _____
- ∞ EX: Write an equation of the line with the given slope and y-intercept.
- ∞ Slope: 8 y-intercept: -7

- ∞ Slope: $\frac{3}{4}$ y-intercept: 3

EX: Write an equation of the line shown.



∞ If you know the point where a line _____
_____ and any _____ on the
line, you can write an _____ of the line by:

∞ Finding the _____ using the _____.

∞ Plugging in _____ and _____ into
_____.

EX:

- EX: Write an equation of the line that passes through the given points.
- $(2, -7), (0, -5)$

Functions

- Remember Function Notation: $f(x) = mx + b$
- EX: $f(5) = 8$ can be written as the ordered pair $(5, 8)$

- EX: $f(0) = -2$ can be written as the ordered pair $(0, -2)$

EX:

∞ EX: Write an equation for the linear function f with the given values

∞ $f(0) = -2, f(8) = 4$

$f(-3) = 6, f(0) = 5$

Slope-Intercept Form

- Remember, in a real-world problem:
- Slope (m) = _____
- Y-intercept (b) = _____

EX:

- ∞ A dance academy charges \$20 to use the facility and \$25 per hour of instruction.
- ∞ A) Write an equation that gives the total cost to learn dance at the academy as a function of hours of instruction.
- ∞ B) Find the total cost for 2 hours of dance instruction.

4.2

Use Linear Equations in Slope- Intercept Form



Writing an Equation of a Line in Slope-Intercept Form:

- ∞ 1) Identify the _____. You can use the _____ to find slope if you know _____ on the line.
- ∞ 2) Find the _____. You can substitute the _____ and the coordinates of a _____ on the line into _____. Then _____.
- ∞ 3) Write the equation by substituting _____.

EX:

∞ EX: Write an equation of the line that passes through the given point and has the given slope m .

∞ $(-1, 3), m = -4$

$(8, -4), m = -3/4$

EX:

∞ EX: Write an equation of the line that passes through the given points.

∞ $(1, -2), (-5, 4)$

$(10, -5), (-5, 1)$

EX:

∞ EX: Write an equation for a linear function f that has the given values.

∞ $f(-2) = 10, f(4) = -2$

$f(2) = 7, f(4) = 6$

EX:

- ∞ A gym charges \$35 per month after an initial membership fee. A member has paid a total of \$250 after 6 months. Write an equation that gives the total cost of a gym membership as a function of the length of membership (in months). Find the total cost of membership after 10 months.

4.3

Write Linear Equations in Point- Slope Form



Point-Slope Form

- ∞ The point-slope form of the equation of a nonvertical line through a given _____ with a _____ is:
- ∞ When asked to write an equation on point-slope form, plug in numbers for _____.
 - Leave _____ as variables.

EX:

- Write an equation in point-slope form of the line that passes through the given point and has the given slope.
- $(-1, 4)$, $m = -2$ $(-11, -3)$, $m = -9$

∞ To write an equation in point-slope form given 2 ordered pairs:

∞ 1) Find the _____ using the _____.

∞ 2) Plug in the _____ and _____ into point-slope form (you will have _____).

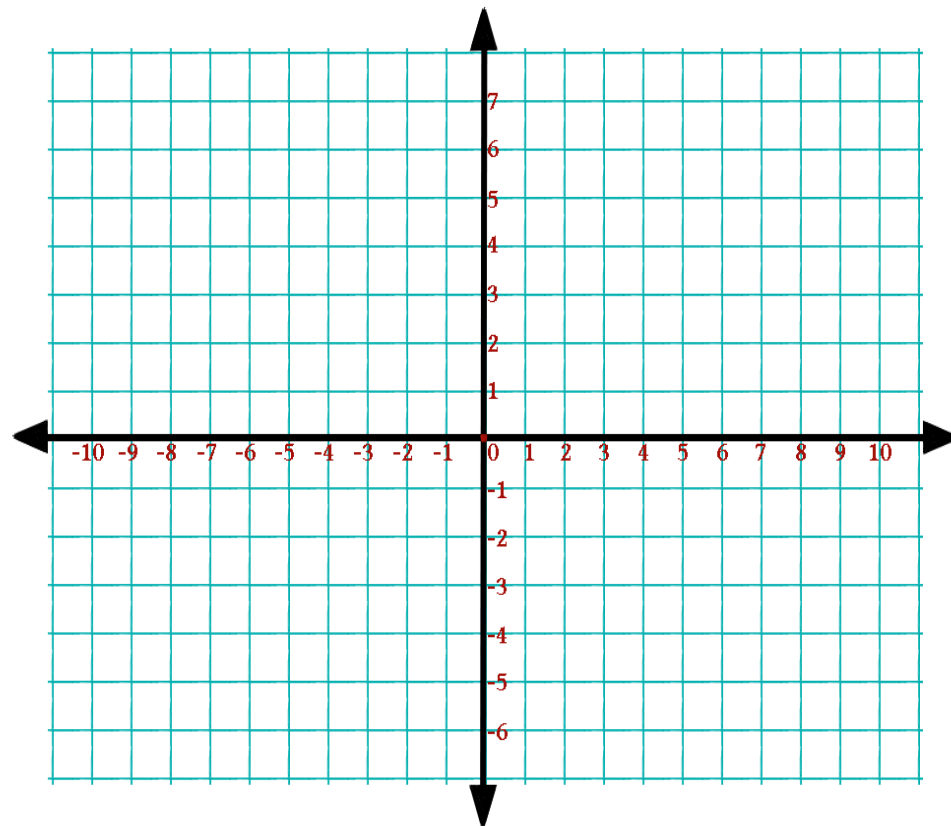
∞ NOTE: The 2 equations will be the _____ if you rewrite them in _____.

EX:

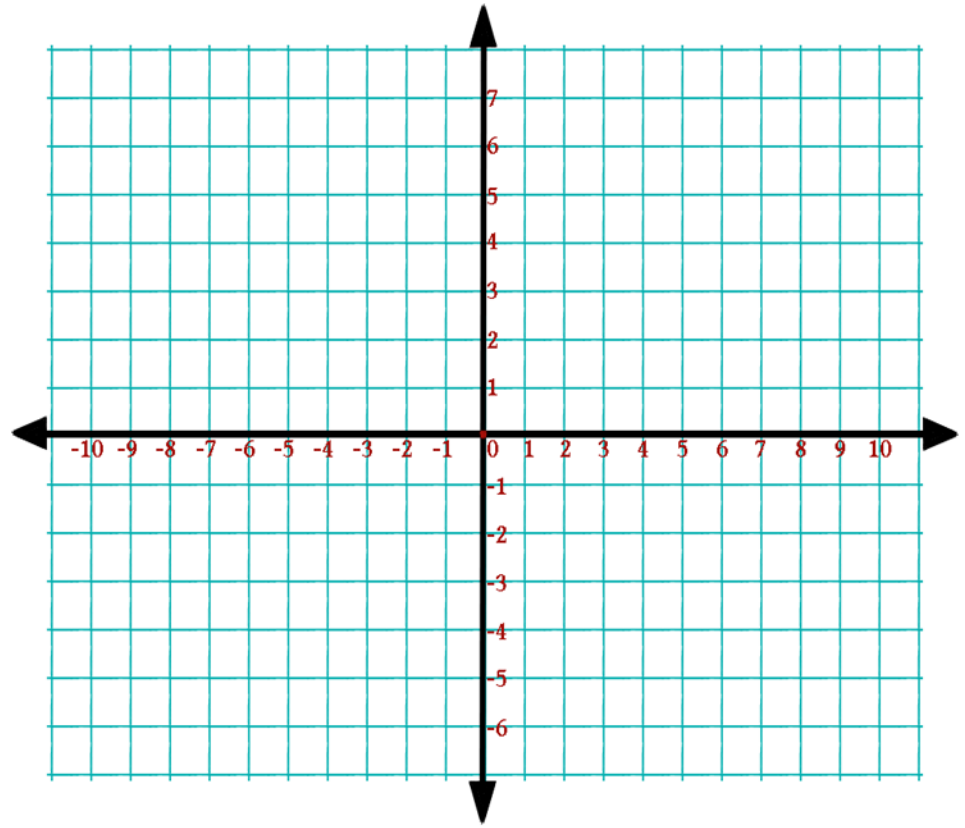
- Write an equation in point-slope form of the line that passes through the given points.
- $(2, 3)$ and $(4, 4)$ $(-4, -1)$ and $(6, -7)$

∞ You can graph an equation in point-slope form by plotting the given ordered pair and using the slope to find another point on the line.

∞ EX: Graph $y - 1 = -(x - 2)$



EX: Graph $y + 3 = -2(x - 2)$



EX:

- ⌘ A radio station charges \$650 for the first minute of ad time and then \$340 for each additional minute. Write an equation that gives the total cost (in dollars) to run an ad as a function of the number of minutes the ad runs. Then find the cost of 7 minutes of ad time.

4.4

Write Linear Equations in Standard Form



Standard Form

- ∞ _____ where A, B, and C are real numbers.
- ∞ An equation in _____ or _____ can be written in _____ by rearranging it to match the format of _____.
 - Get _____ on the _____.
- ∞ EX: Rewrite $y - 1 = -3(x - 1)$ in standard form.

EX:

- ∞ Write an equation in standard form of the line that passes through the given point and has the given slope m or that passes through the two given points.
- ∞ $(-1, 5), m = -2$ $(3, -1), (2, -3)$

EX:

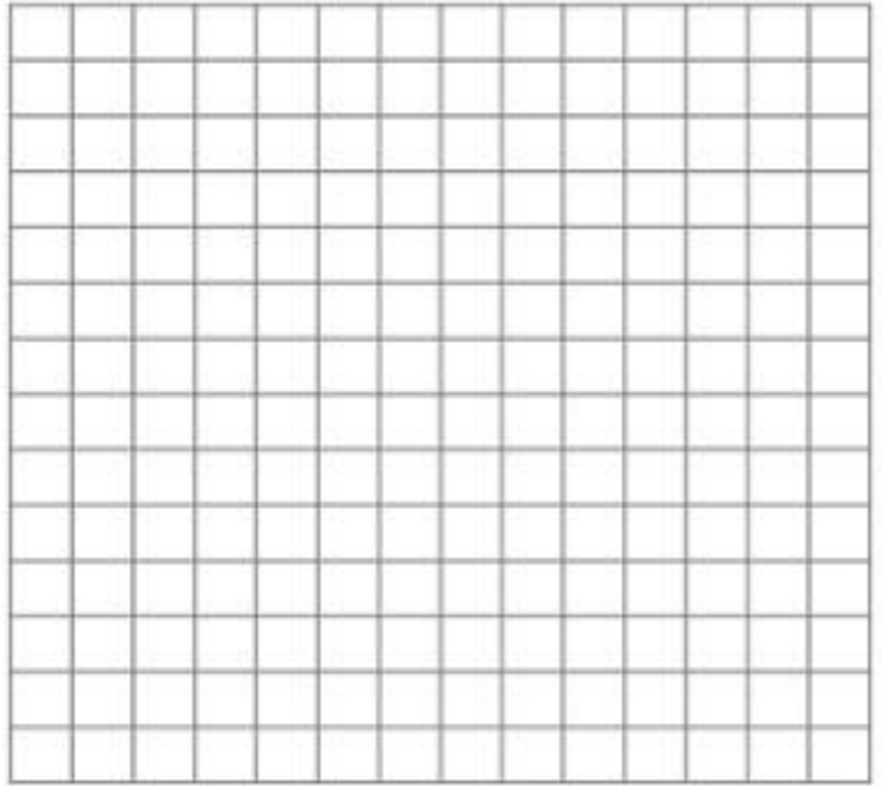
∞ Find the missing coefficient in the equation of the line that passes through the given point.

∞ $-4x + By = 7, (-1, 1)$

$Ax + y = -3, (2, 11)$

EX:

- ☞ T-shirts at a flea market cost \$4.50 each and shorts cost \$6 each. You have \$108 to spend.
- ☞ A) Write an equation in standard form that models the possible combinations of t-shirts and shorts you can buy.
- ☞ B) Graph the equation (using x and y intercepts).
- ☞ C) Tell what the intercepts of the graph mean in this situation.
- ☞ D) If you buy 12 pairs of shorts, how many shirts can you buy?



4.5

Write Equations of Parallel and Perpendicular Lines



Parallel Lines

- ∞ Parallel Lines – lines that _____
- Parallel lines have the _____



EX:

- EX: Write an equation of the line that passes through the given point and is parallel to the given line.
- $(5, -1), y = -\frac{3}{5}x - 3$

EX cont:

∞ $(-2, 5), 2y = 4x - 6$

Perpendicular Lines

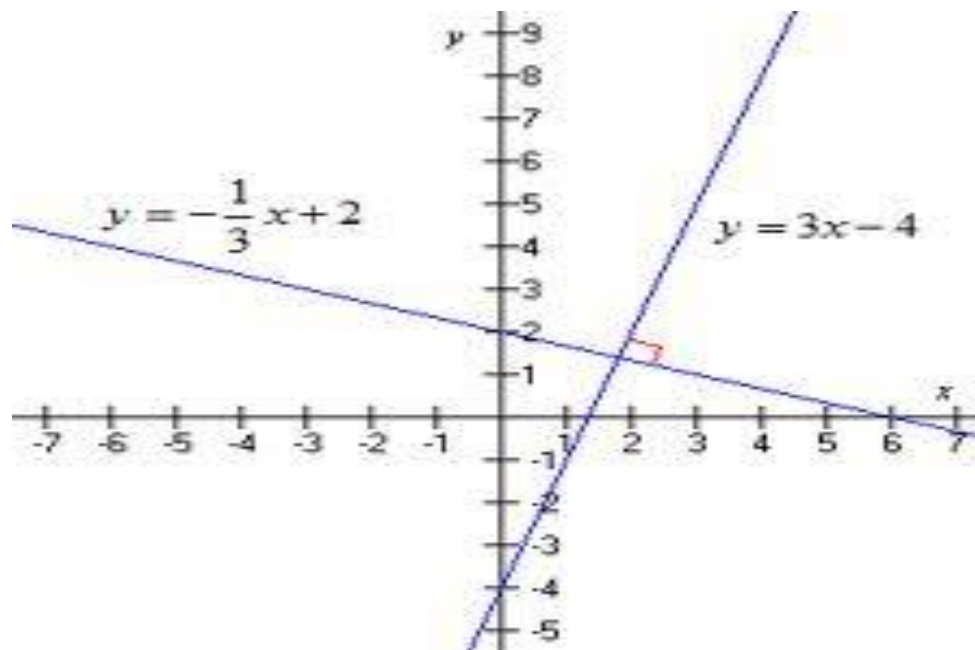
∞ Perpendicular Lines – lines that intersect to form a

_____.

- Perpendicular lines have _____ that are _____ of each other.

- “ _____ ”

- EX:



EX:

- ∞ Write an equation of the line that passes through the given point and is perpendicular to the given line.
- ∞ $(-4, -1), y = \frac{4}{3}x + 6$

EX cont:

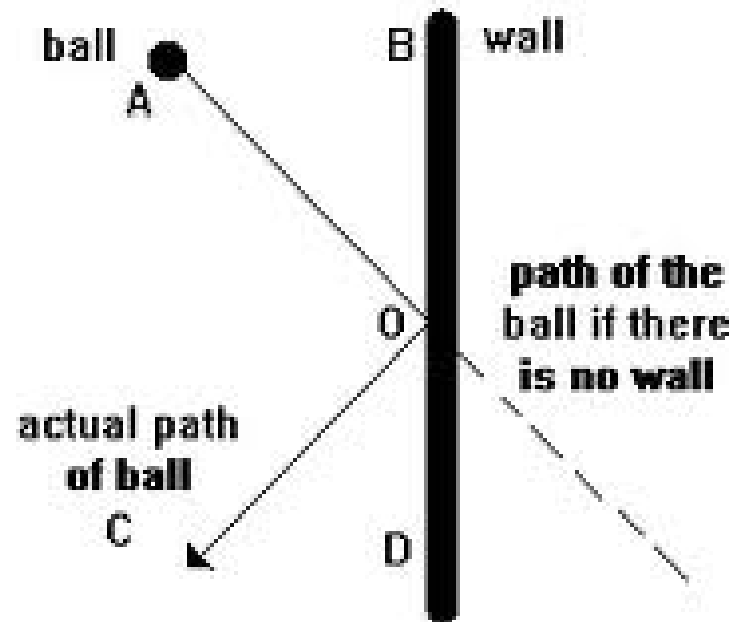
∞ $(-5, 2), y + 3 = 2x$

EX:

- ∞ Determine which lines, if any, are parallel or perpendicular.
- ∞ Line a: $2x + 6y = -3$
- ∞ Line b: $y = 3x - 8$
- ∞ Line c: $-1.5y + 4.5x = 6$

EX:

- ∞ The path of a golf ball bouncing off a curved wall on a mini golf course is shown. Lines a and b of the path appear to be perpendicular. Are they?
- ∞ Line a: $3y = 2x - 1$
- ∞ Line b: $2y = -3x + 21$



4.6

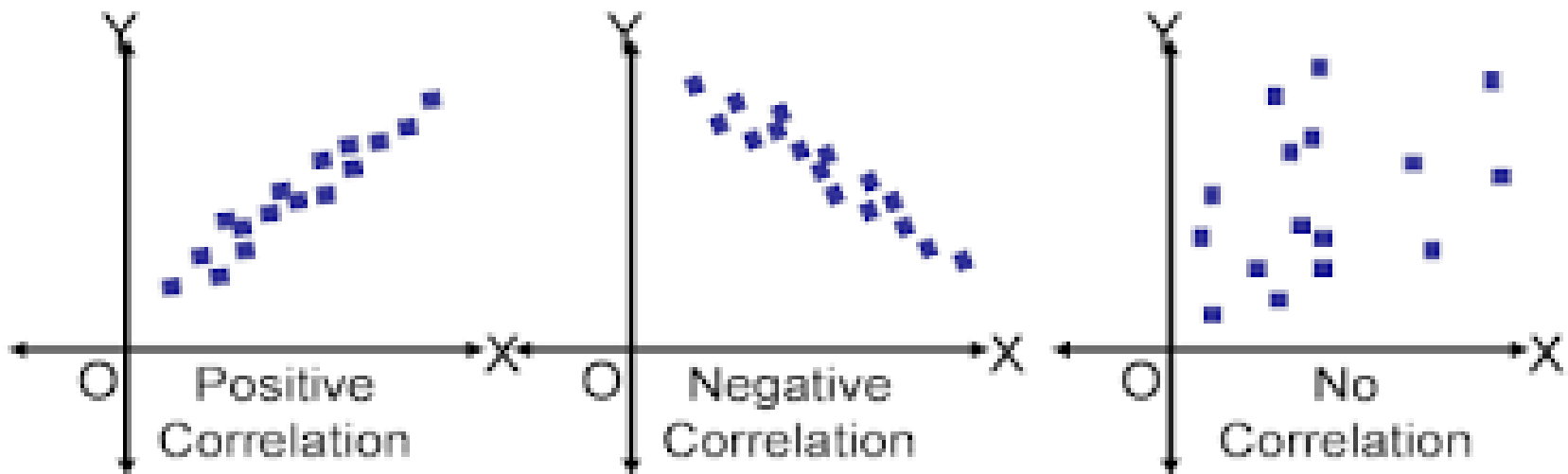
Fit a Line to Data



Scatter Plot

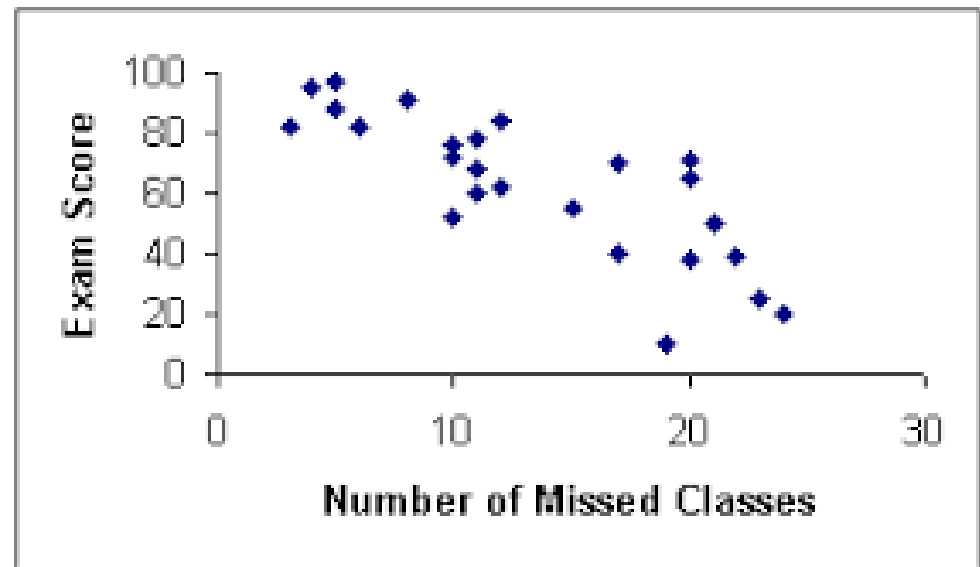
- ☞ A _____ used to determine whether there is a _____.
- ☞ Show _____.

SCATTER PLOT EXAMPLES



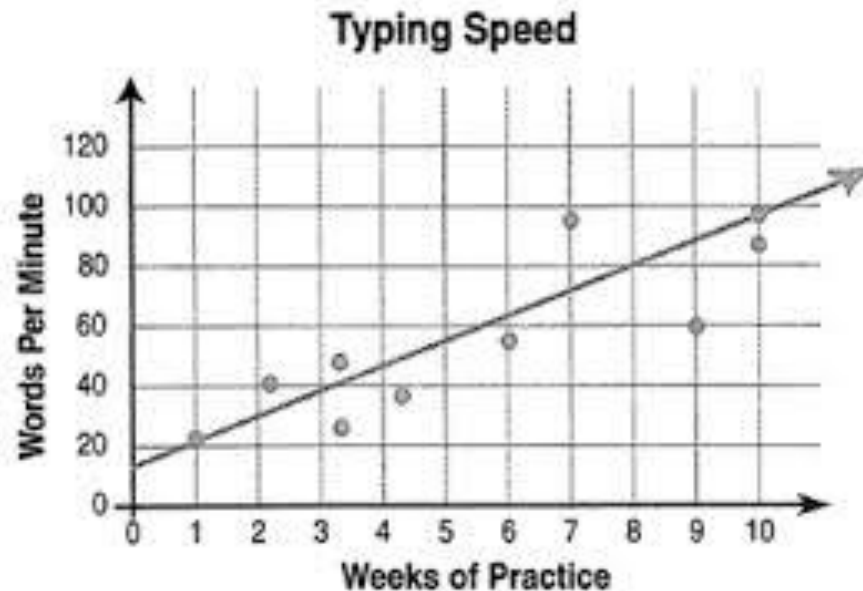
EX:

- ∞ Describe the correlation.
- ∞ Use the scatter plot to predict a reasonable exam score for 5 missed classes and 25 missed classes.



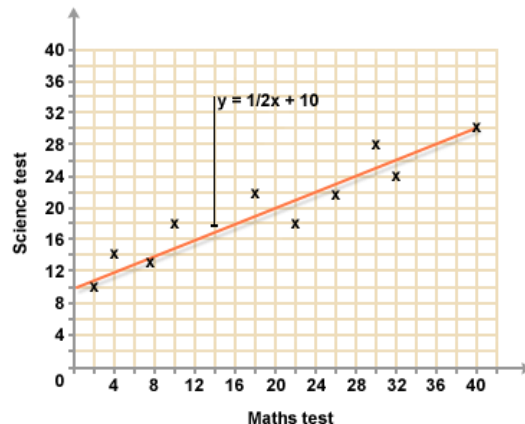
Line of Fit

- ∞ When data represents _____ or _____ correlation, you can _____ in the data using a _____.
- ∞ A line that _____ between all _____.



To Draw and Write a Line of Fit:

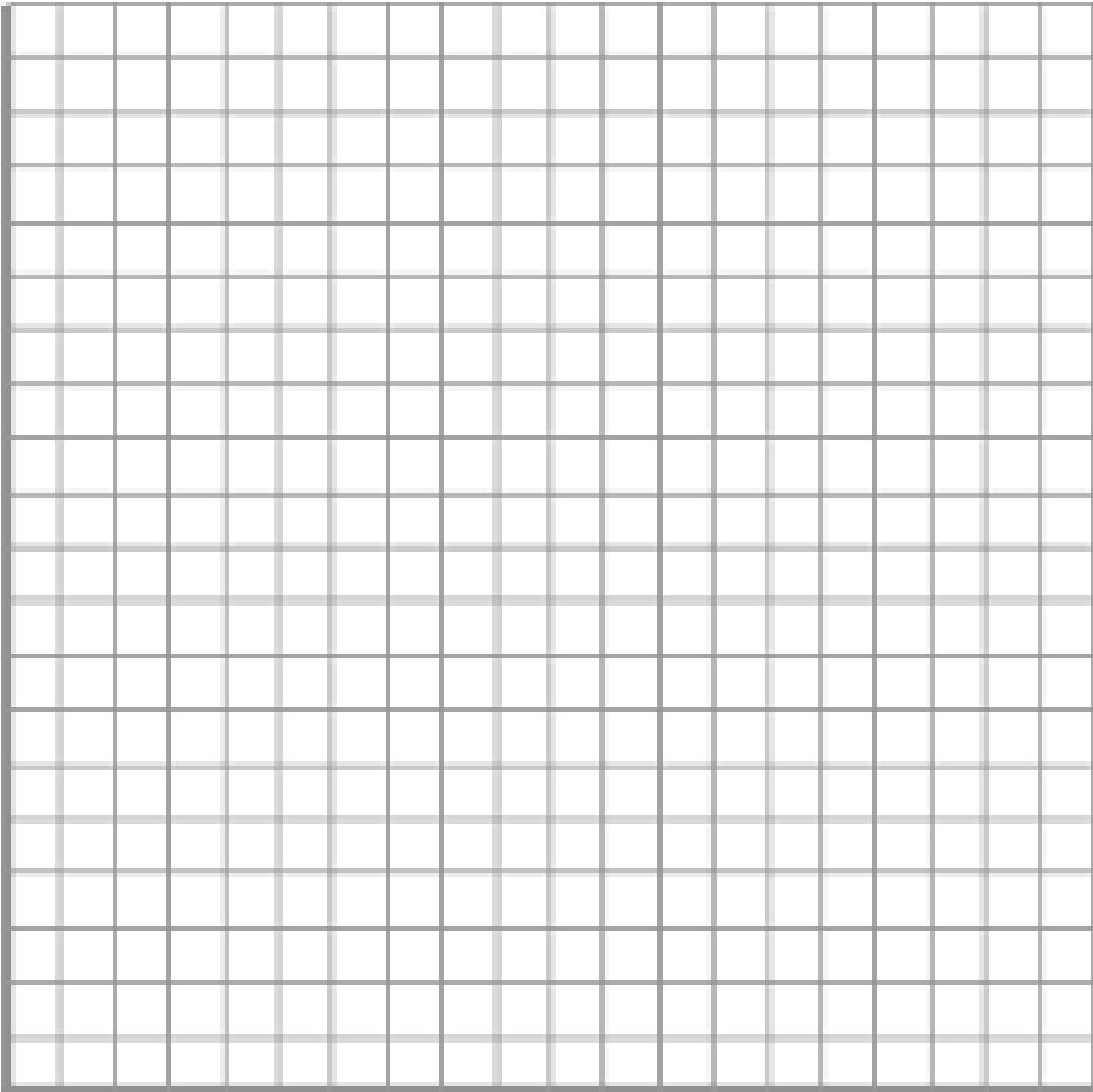
- 1) Make a _____.
- 2) Decide if the data can be _____.
- 3) Draw a _____ that appears to _____
_____ (about the same number of points
_____ and _____ the line).
- 4) Write an _____ using _____
on the _____.



EX:

- ∞ Make a scatter plot of the data. Draw a line of best fit. Write an equation of the line.

X	1	1	3	4	5	6	9
Y	10	12	33	46	59	70	102



EX:

- ∞ Make a scatter plot of the data in the table. Draw a line of fit. Write an equation of the line that models Grade Point Average as a function of hours studying.

Friend	Number of hours of studying per week	Grade Point Average (out of 5.0)
Allie	14	3.91
Samantha	42	4.98
Hayley	10	3.22
Jessica	32	4.81
Megan	5	2.0
Rachel	10	2.82
Briley	25	3.79
Lauren	18	3.48

