Math Virtual Learning

8th Grade Math

Scatter Plots: Review

May 1, 2020

8th Grade Math
Lesson: May 1

Learning Target:

Student will review scatter plot concepts.

Lesson Includes:

1) Vocabulary
2) Writing Equations
3) Make Predictions

Warm Up Activity

Given the equation for the trend line use it to make predictions. Answers are at the bottom of the slide.

The number of vehicles on a portion of a highway (x) and the average speed the vehicles were traveling (y) was recorded at various points of the day over several months.
The trend line on the scatter has an equation of $y = -0.025x + 70$.

Prediction 1: How many vehicles were on the highway if the vehicles were traveling at an average speed of 45 miles per hour?

Prediction 2: If there were 2,000 vehicles on the highway, what was the average speed of the vehicles?

Answer: Prediction 1: 1000 vehicles
Prediction 2: Speed of 20 mph

Review - Vocabulary: Scatter Plots

Review the vocabulary from yesterday. Then rewatch the video, if you need.

Bivariate Data: Data with two variables

Independent Variable: The variable **x** whose variation does not depend on another variable. The variable that changes.

Dependent Variable: The variable **y** who does depend on another variable. The variable that depends on x.

Scatter Plots: A graph that uses points to display bivariate data.

Increasing/Positive Trend: When the variables move together. As x increases, y increases.

Decreasing/Negative Trend: When the variables move in opposite directions. As x increases, y decreases.

No Trend: When the variables move randomly, not together or in opposite directions.

Linear Trend: When a straight line can be drawn within the data.

Non-Linear Trend: When a straight line cannot be drawn within the data.

Association: A relationship between two variables.

- **Strong**: If the points of data are close together.
- **Weak**: If the points of data are widely spread not close together. Some spacing.
- **No**: If the points of data are random. VERY spread out.

Review: Writing Equations & Making Predictions

Review the steps below. Then watch the videos linked on writing or predictions, if needed.

Writing Equations Steps:

1) Choose any two points on the trend line. These have to be exactly through the line.
2) Use the two points to find the slope (m) of the line.
    a) Draw a stair step from one point to the second point.
    b) Count the vertical change.
    c) Count the horizontal change.
    d) Divide and simplify, when possible. Check the sign.
3) Use the y-axis to find the y-intercept (b) of the line.
    a) Identify where the line crosses the y-axis
    b) Write the y-intercept as an ordered pair (0, b).
4) Use the slope (m) and y-intercept (b) to write an equations in slope-intercept (y = mx + b)

Making Predictions Steps:

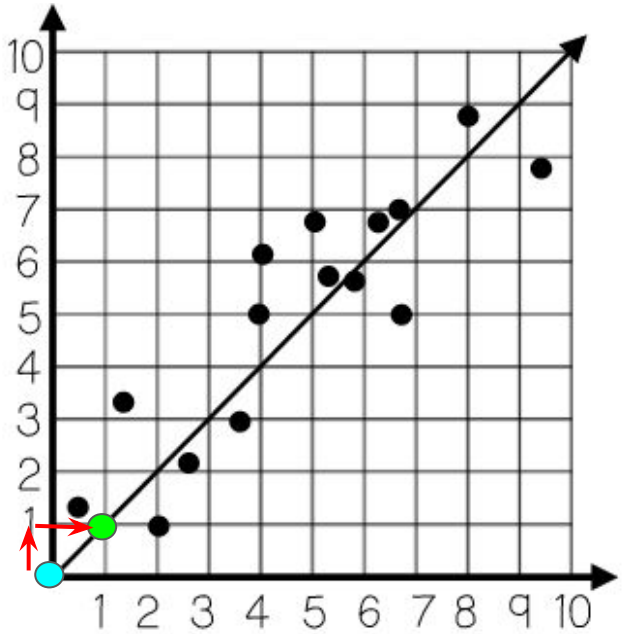
1) Write the slope-intercept form (y = mx + b) equation of your trend line.
2) Use the equation and substitute the x or y value into the equation.
    X: independent variable, has an effect on the y (ex. Time worked)
    Y: dependent variable, is effected by the x, final answer (ex. $ made)
3) Solve the equation.

Instruction: Scatter Plots

Review the example on this slide and the next two slides.

Directions for the examples: Answer the questions.

1) State the association (strong, weak, no).
2) State the trend (increasing, decreasing, no AND linear, non-linear).
3) Write the equation.
4) Make the predictions. What is the value when x =5? What is the value when y = 12?



Association: Strong
Trend: Increasing, Linear

Slope: 1/1 → 1
y-intercept: (0,0)
Equation: y = x

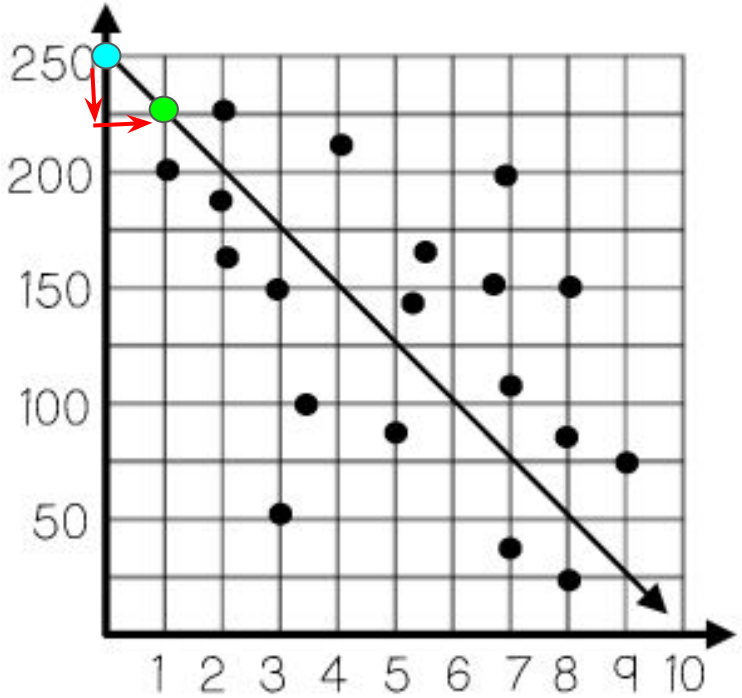
Prediction 1
When x=5:
y=x
y=(5)
y=5

Prediction 2
When y=12:
y=x
(12)=x
12=x

Instruction: Scatter Plots

Review the example below. Directions for the examples: Answer the questions.

1) State the association (strong, weak, no).
2) State the trend (increasing, decreasing, no AND linear, non-linear).
3) Write the equation.
4) Make the predictions. What is the value when x = 100? What is the value when x = 500?



Association: Weak
Trend: Decreasing, Linear

Slope: -25/1 → -25
y-intercept: (0, 250)
Equation: y = -25x + 250

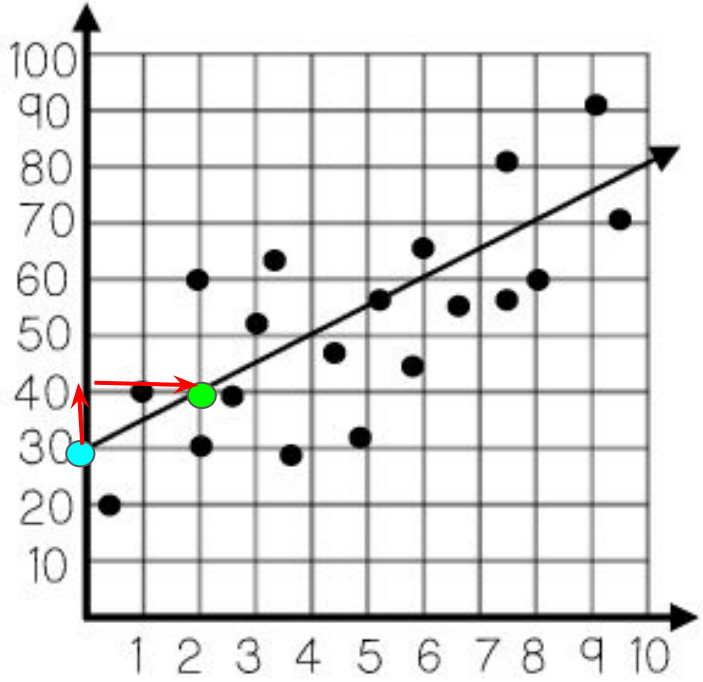
Prediction 1
When x=100:
y=-25x+250
y=-25(100)+250
y=-2,500+250
y=-2,250

Prediction 2
When x=500:
y=-25x+250
y=-25(500)+250
y=-12,500+250
y=-12,250

Instruction: Scatter Plots

Review the example below. Directions for the examples: Answer the questions.

1) State the association (strong, weak, no).
2) State the trend (increasing, decreasing, no AND linear, non-linear).
3) Write the equation.
4) Make the predictions. What is the value when x = 40? What is the value when y = 630?



Association: Strong
Trend: Increasing, Linear

Slope: 10/2 → 5
y-intercept: (0,30)
Equation: y = 5x + 30

Prediction 1
When x=40:
y=5x+30
y=5(40)+30
y=200+30
y=230

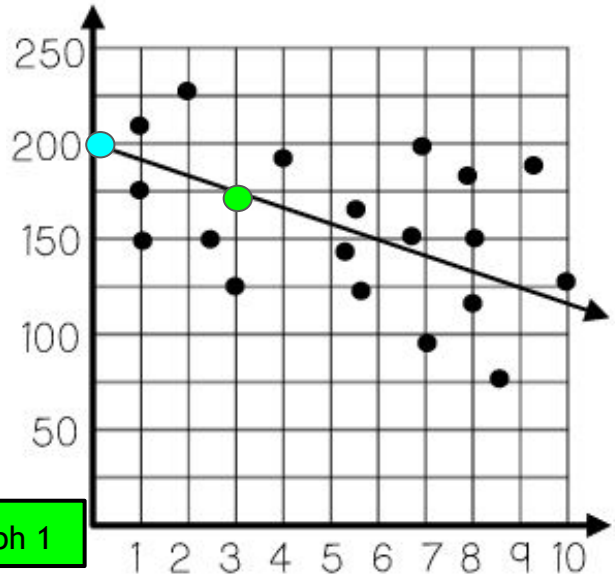
Prediction 2
When y=630:
y=5x+30
630=5x+30
-30 -30
600=5x
120=x

Practice: Scatter Plots

On a piece of paper: Answer the questions.

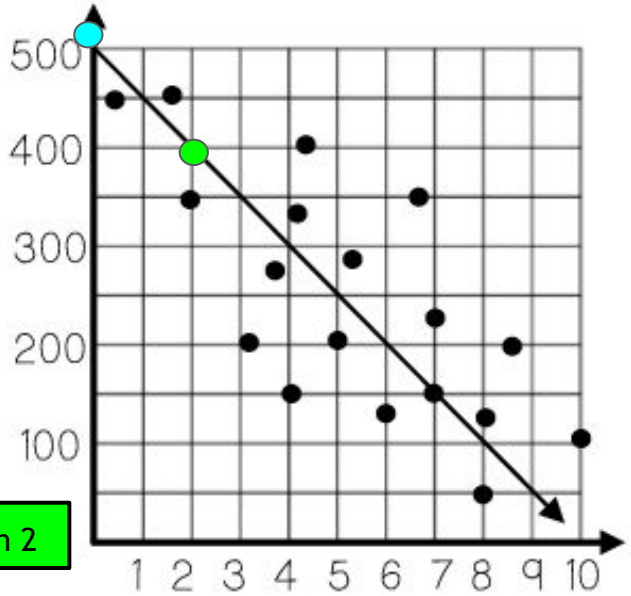
1) State the association (strong, weak, no).
2) State the trend (increasing, decreasing, no AND linear, non-linear).
3) Write the equation.
4) Make the prediction.

What is the value when x = 6?
What is the value when x = 15?



Graph 1

What is the value when x = 3?
What is the value when y = -100?



Graph 2

Practice: Scatter Plots ANSWERS

Check your work from the previous slide.

Graph 1

Association:

Weak

Trend:

Decreasing/ Linear

Equation:

Slope: -50/6 → -25/3 → -8.3

y-intercept: (0,200)

Equation: y = -25/3x + 200 or y = -8.3x + 200

Prediction 1:

When x=6:

y=-25/3x+200

y=-25/3(6)+200

y=-50+200

y=150

Prediction 2:

When x=15:

y=-25/3x+200

y=-25/3(15)+200

y=-125+200

y=75

Graph 2

Association:

Weak

Trend:

Decreasing, Linear

Equation:

Slope: -100/2 → -50

y-intercept: (0,500)

Equation: y = -50x + 500

Prediction 1:

When x=3:

y=-50x+500

y=-50(3)+500

y=-150+500

y=350

Prediction 2:

When y=-100:

y=-50x+500

-100=-50x+500

-500 -500

-600=-50x

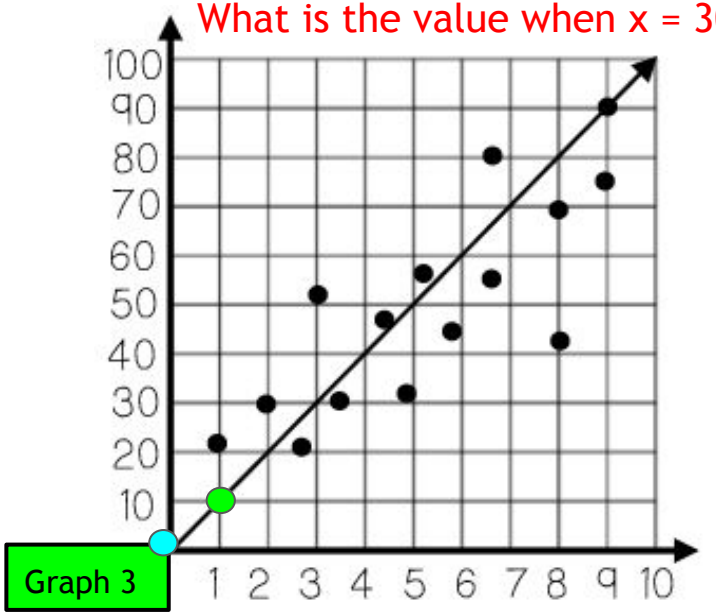
12=x

Practice: Scatter Plots

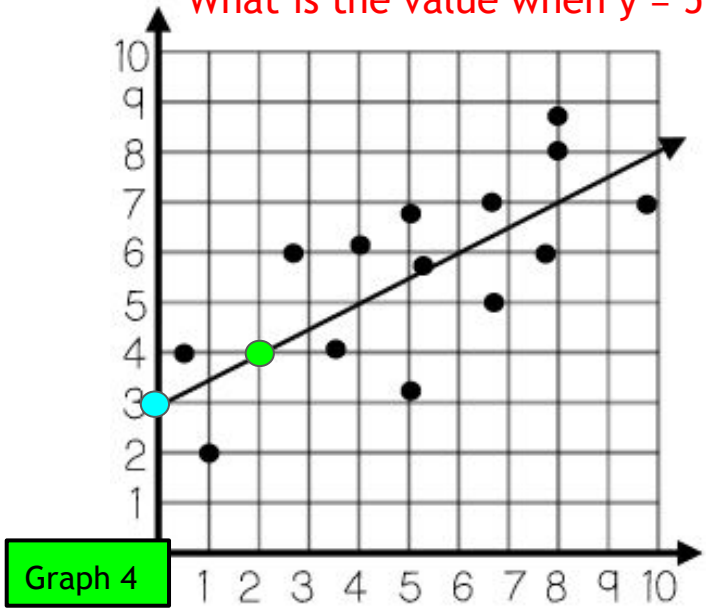
On a piece of paper: Answer the questions.

1) State the association (strong, weak, no).
2) State the trend (increasing, decreasing, no AND linear, non-linear).
3) Write the equation.
4) Make the prediction.

What is the value when x = 7?
What is the value when x = 30?



What is the value when x = 10?
What is the value when y = 5?



Practice: Scatter Plots ANSWERS

Check your work from the previous slide.

Graph 3

Association:
Weak

Trend:
Increasing, Linear

Equation:
Slope: 10/1 → 1
y-intercept: (0,0)
Equation: y = 10x

Prediction 1:
When x=7:
y=10x
y=10(7)
y=70

Prediction 2:
When x=30:
y=10x
y=10(30)
y=300

Graph 4

Association:
Weak

Trend:
Increasing, Linear

Equation:
Slope: ½
y-intercept: (0,3)
Equation: y = -1/2x + 3 or y = 0.5x + 3

Prediction 1:
When x=10
y=0.5x+3
y=0.5(10)+3
y=5+3
y=8

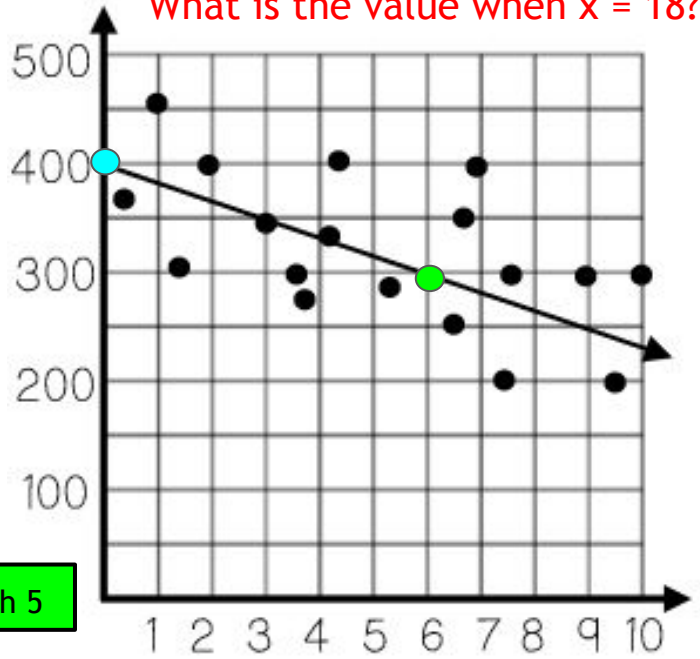
Prediction 2:
When y=5
y=0.5x+3
5=0.5x+3
-3 -3
2=0.5x
4=x

Practice: Scatter Plots

On a piece of paper: Answer the questions.

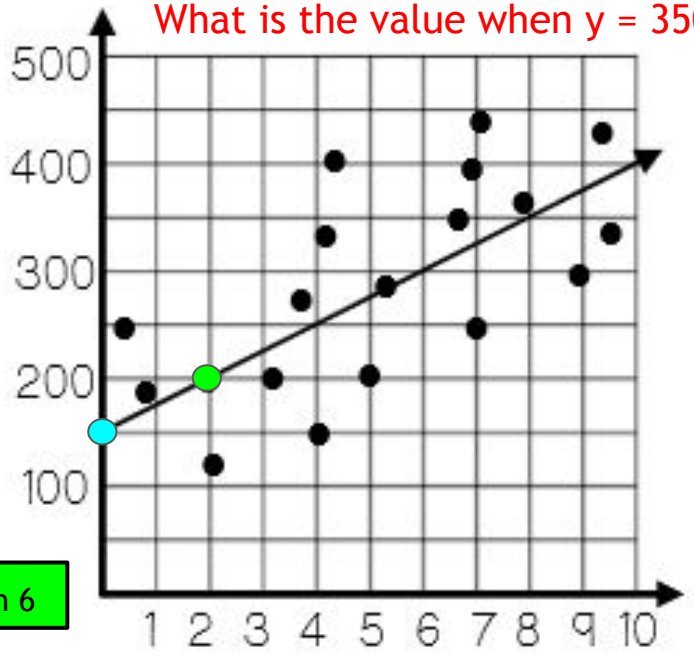
1) State the association (strong, weak, no).
2) State the trend (increasing, decreasing, no AND linear, non-linear).
3) Write the equation.
4) Make the prediction.

What is the value when x = 9?
What is the value when x = 18?



Graph 5

What is the value when x = 27?
What is the value when y = 350?



Graph 6

Practice: Scatter Plots ANSWERS

Check your work from the previous slide.

Graph 5

Association:
Strong

Trend:
Decreasing, Linear

Equation:
Slope: -100/6 → -50/3 → -16.67
y-intercept: (0,400)
Equation: y = -50/3x + 400 or y = -16.67x + 400

Prediction 1:
When x=9:
y=-50/3x+400
y=-50/3(9)+400
y=-150+400
y=250

Prediction 2:
When x=18:
y=-50/3x+400
y=-50/3(18)+400
y=-300+400
y=100

Graph 6

Association:
Weak

Trend:
Increasing, Linear

Equation:
Slope: 50/2 → 25
y-intercept: (0,150)
Equation: y = 25x + 150

Prediction 1:
When x=27:
y=25x+150
y=25(27)+150
y=675+150
y=825

Prediction 2:
When y=350:
y=25x+150
350=25x+150
-150 -150
200=25x
8=x

Additional Practice:

Click on the links below to get additional practice and to check your understanding!

Making Predictions

Line of Best Fit

Slope and y-intercept from a graph

Slope-Intercept Form

Line of Best Fit