Rutherford County Schools – Individual Learning Modules

Integrated Math I

Day 1 – Triangle Congruence

Watch this Khan Academy Video and do some practice - bit.ly/IM1Day1A
Explore this awesome Desmos Activity on Congruent Triangles – bit.ly/IM1Day1B

Zari and Taye are training for track season. They each go on training runs from their homes. Zari's house is located at point A and Taye's house at point A' on the coordinate plane shown. Each unit on the coordinate plane corresponds to one mile.
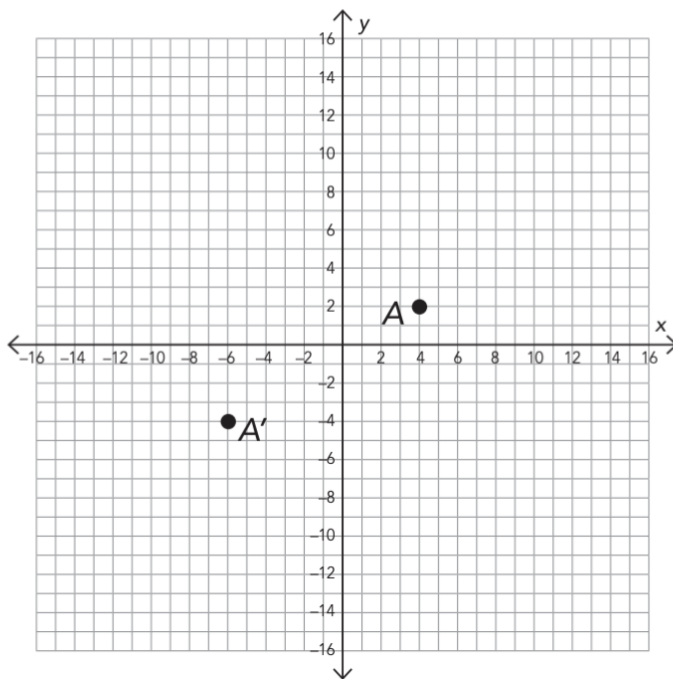

1. On one day of training, Zari runs 2 miles north, then 4 miles east, and then back to her house via the shortest route. Taye runs 2 miles west, then 4 miles south, and then back to his house, again via the shortest route.

   Draw their routes on the coordinate plane. Demonstrate that the two triangles formed by their routes are congruent. Include a triangle congruency statement in your response.

2. On another day of training, Zari runs on a straight path to a park located at (8, 12) on the grid, and from there she runs on a straight path to the school located at (10, 6) on the grid. From the school she runs on a straight path directly back to her house. Taye runs on a straight path to a library located at (−12, 0) on the grid, and from there he runs on a straight path to a tennis court located at (−10, 6) on the grid. From the tennis court he runs on a straight path directly back to his house.

   Draw their routes on the coordinate plane. Demonstrate that the two triangles formed by their routes are congruent. Include a triangle congruency statement in your response.

3. Zari and Taye complete long runs over the weekend. They start at the same place. Zari heads directly east and Taye heads directly west. After running the same distance, Zari heads due south and Taye heads due north. Their routes are represented by the figure below. Zari's route is represented by △ABC and Taye's route is represented by △A'B'C'.
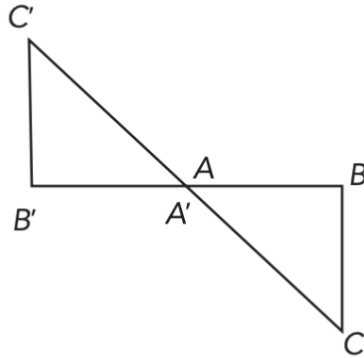
Is △ABC congruent to A'B'C'? Explain your reasoning.

**Reflection Question:** How do we know if two triangles are congruent?

Answer: If rigid motions (reflections, rotations, translations) applied to one triangle results in the second triangle, then the two triangles are congruent. Another way is to show that SSS, SAS, ASA, or AAS apply to the triangle pair.
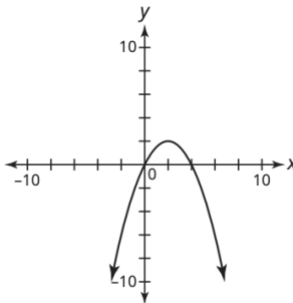
Day 2 – Functions

Watch this Khan Academy Video and do some practice - bit.ly/IM1Day2A
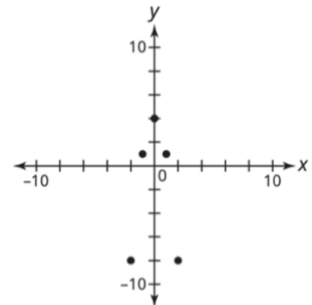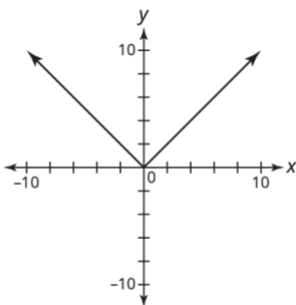Explore this awesome Desmos Activity on Domain and Range - bit.ly/IM1Day2B
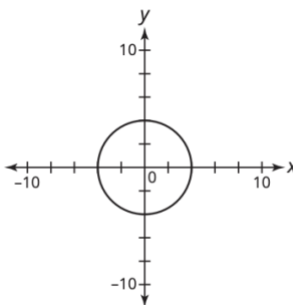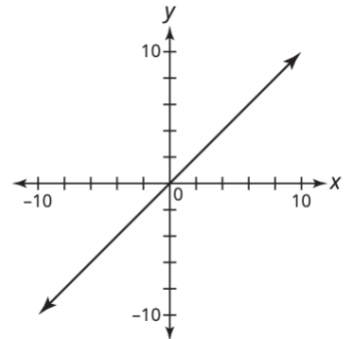
A
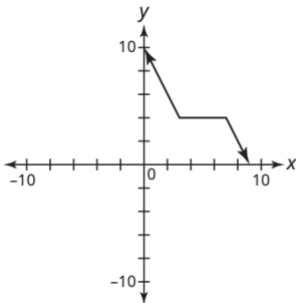
B

E

C

D

F

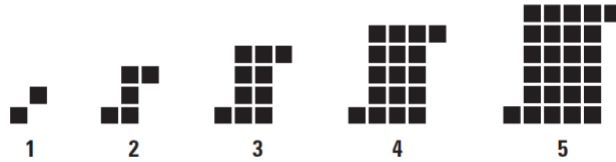
Answer the following for each of the graphs above.
- What is the domain of the graph?
- What is the range of the graph?
- Is it a function or not? Explain.
- Does the graph have any horizontal or vertical symmetries?

- For graphs C and F, write the equation of the function.

Reflection Question: What is a function?

Day 3 - Patterns

1. What patterns do you notice in the figure?
2. Sketch the next two figures in the sequence.
3. Determine an equation for the total number of tiles in any figure in the sequence. Explain your equation and show how it relates to the visual diagram of the figure. Try to find as many different equations as possible.
4. If you knew the figure had 9802 tiles in it, how could you determine the figure number? Explain.

Day 4 – Linear Equations and Linear Regression

Linear Regressions: Two Thumbs Up

Dexter is curious as to whether there is a relationship between a person's height and thumb length. Fourteen of his classmates volunteered to be measured. He listed his data in a table.
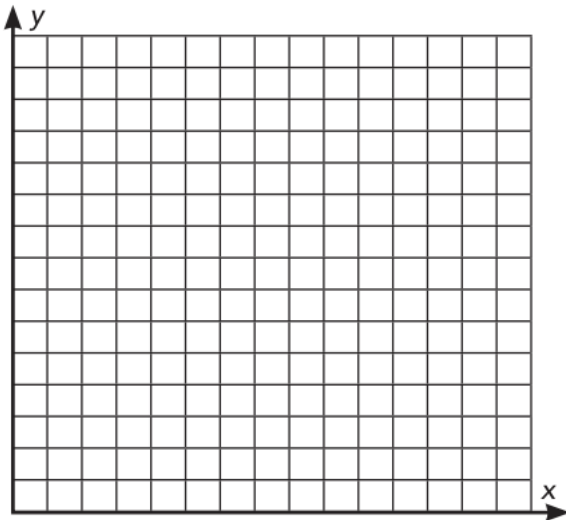
Height (cm)	Thumb Length (cm)
167.6	6.5
152.4	6.1
165.1	6.5
167.6	6.5
165.1	7.2
152.4	6.4
167.6	7.5
160.0	7.1
162.5	6.5
160.0	6.8
165.1	6.8
170.1	7.4
170.1	7.7
165.1	7.0

- Create a scatter plot and write any observed associations in the data.
- Write the regression equation (line of best fit) and plot it on the graph.
- Explain what the constant and coefficient represent in the situation.
- Write the correlation coefficient and use it to explain how well the regression line fits the data.
- Predict the thumb length of a person who is 174 cm tall.

Linear Equations

Watch this Khan Academy Video and do some practice - [bit.ly/IM1Day4A](bit.ly/IM1Day4A)

Try this open middle problem:

Directions: Using the digits 1 to 9, at most TWO times each, fill in the boxes to make an equation with no solutions.

$$\square\, x + \square = \square\, x + \square$$

Answer: There are many answers, but the coefficient of both x terms have to be the same and the constants must have different values. So, $2x + 3 = 2x + 4$ is an answer because it is equivalent to $3 = 4$, for which there is no solution.

Day 5 – Writing Sequences

Watch these Khan Academy Videos and do some practice - [bit.ly/IM1Day5A](bit.ly/IM1Day5A) and [bit.ly/IM1Day5B](bit.ly/IM1Day5B)

Consider the sequence 2,6,18,54 …

1. Is this an arithmetic or geometric sequence?
2. Write a function to represent this sequence.
3. Use the function to find the 12th term in this sequence.

Answer: (1) Geometric, (2) $g_n = 2(3)^{n-1}$, (3) 354,294
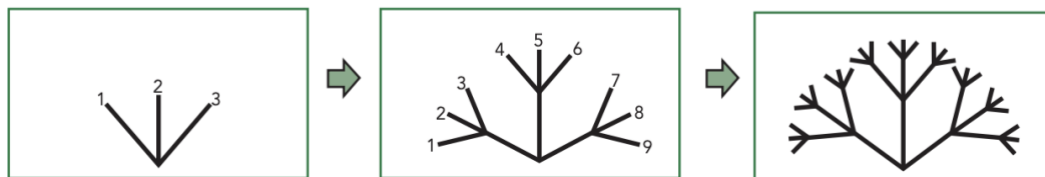
Sequences:
How Does Your Garden Grow?

Chris and Dexter are completing a science project together for which they are asked to monitor the growth patterns of new trees. They agree to record their findings once a week for three weeks. At the end of three weeks, they meet and share their findings.

- Chris's findings: The tree had grown 3 cm by the end of the first week and continued to grow 1 cm each week that followed.
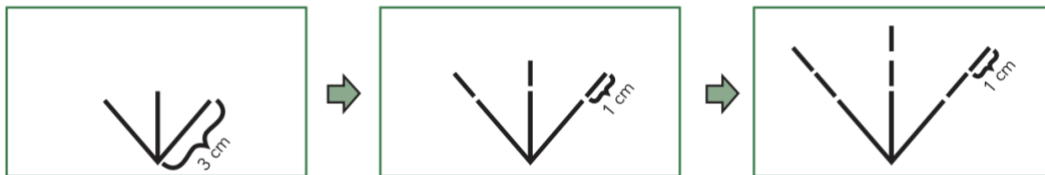
- Dexter's findings: The tree had 3 branches at the end of the first week. For every passing week, each branch end separated into 3 more branches.

- Write a numerical sequence for each pattern, including a description of the type of sequence that is formed.
- Create a table of values to represent Chris's findings and Dexter's findings.
- Draw a graph to represent Chris's findings and Dexter's findings.
- Write a recursive formula and explicit formula for each.
- Explain similarities and differences between the two sequences using math terms.