Coordinate graphs, translations and reflections

(Grade levels: 7^{th} and 8^{th})
5-day unit

Using: Geometer's Sketchpad (GSP)
TI-83 plus graphing calculator
Computers
Mira
Graph paper
Rulers
Group work
Overhead

Evaluation: Written assignments
Computer assignments
Class quiz

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$I^2 T^2$ Project
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Overall Unit Objectives

- Students will be able to identify, label, and plot points on a coordinate graph, using graph paper and the GSP program.

- Students will be able to plot coordinate points using the calculator and develop concepts associated with domain and range.

- Every student will demonstrate the knowledge of a vertical and horizontal translation.

- All students will use a Mira to reflect figures over lines of reflection.

Unit Standards and Principles

NCTM Standards:

- Numbers and Operations
- Geometry
- Measurement
- Reasoning and Proof
- Communication
- Representation

New York State Core Curriculum:

- Key Idea 1- Mathematical Reasoning
- Key Idea 2- Number and Numeration
- Key Idea 4- Modeling/Multiple Representation
- Key Idea 5- Measurement

NCTM Principles:

- Equity
- Curriculum
- Teaching
- Learning
- Assessment
- Technology

Day-By-Day Activities

Day 1: Using GSP program, there will be a coordinate graph displayed unlabeled. The students will draw a coordinate graph and label as many parts as they can (students will be in groups of two). Selected students will label the computer's graph with the assistance of the teacher.

Assignment: Students will draw a coordinate graph, label, and plot ordered pairs. Making geometric figures, they will then be asked to find the perimeter. The assignment will also introduce reflections.

Day 2: Students will be given a worksheet that will guide them through the process of putting their ordered pairs into lists and plotting them as a scatter plot on the graphing calculator. Domain and range concepts will also be discussed.

Assignment: Have students do the same procedure with factors of 12,24,7,13 and graph the results in a scatter plot, and then have them write in paragraph form their conclusion.

Day 3: Students will be in groups working on translation worksheets and then notes will be given during a class discussion

Assignment: Problems out of the textbook (Transition Mathematics) Pg. 437 (1-12).

Day 4: Students will make a battleship game board using the GSP program and then they will play the game with a classmate.

Assignment: Read pg 440-441 in textbook (Transition Mathematics), on reflections.

Day 5: Student will work in groups to complete worksheet on reflections using a Mira.

Assignment: Students will play game boards made on day 4 at home.

References

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Using: Geometer's Sketchpad (GSP)
TI-83 plus graphing calculator
Computers
Mira
Graph paper
Rulers
Group work
Overhead

Daily Plan

Date: Day 1 **Course:** 7th or 8th **Hour:** 42 min

A. Method:

- Through discussion, notes, and the teacher displaying Geometer's Sketchpad the students will review past knowledge and learn new material on coordinate graphs.

B. Student Objective:

- Students will be able to identify, label, and plot points on a coordinate graph, using graph paper and the GSP program.

C. Opening Activity/Purpose: (10 minutes)

- **Activity:** Using the GSP program, there will be an unlabeled coordinate graph displayed on overhead. The students will draw a coordinate graph and label as many parts as they can. (Students will be in groups of two and will need graph paper). Selected students will label the computer's graph with the assistance of the teacher, while others correct their work. (See notes)
- **Purpose:** This is a good assessment for the teacher to see what the students remember and it introduces the topic. The GSP program is also introduced to the students at this time.

D. Developmental Activities: (25 minutes)

- Using GSP, plot the ordered pairs (8,5) and (-13,10). Have students look at the points and discuss which number is the x-value and y-value in the ordered pairs. (Do this with several points).
- Class discussion on notes about coordinate graphs. Giving examples on the overhead with the GSP program.
- Students will work in groups of three to complete PG 425 (2-13) in the Transition Mathematics textbook.

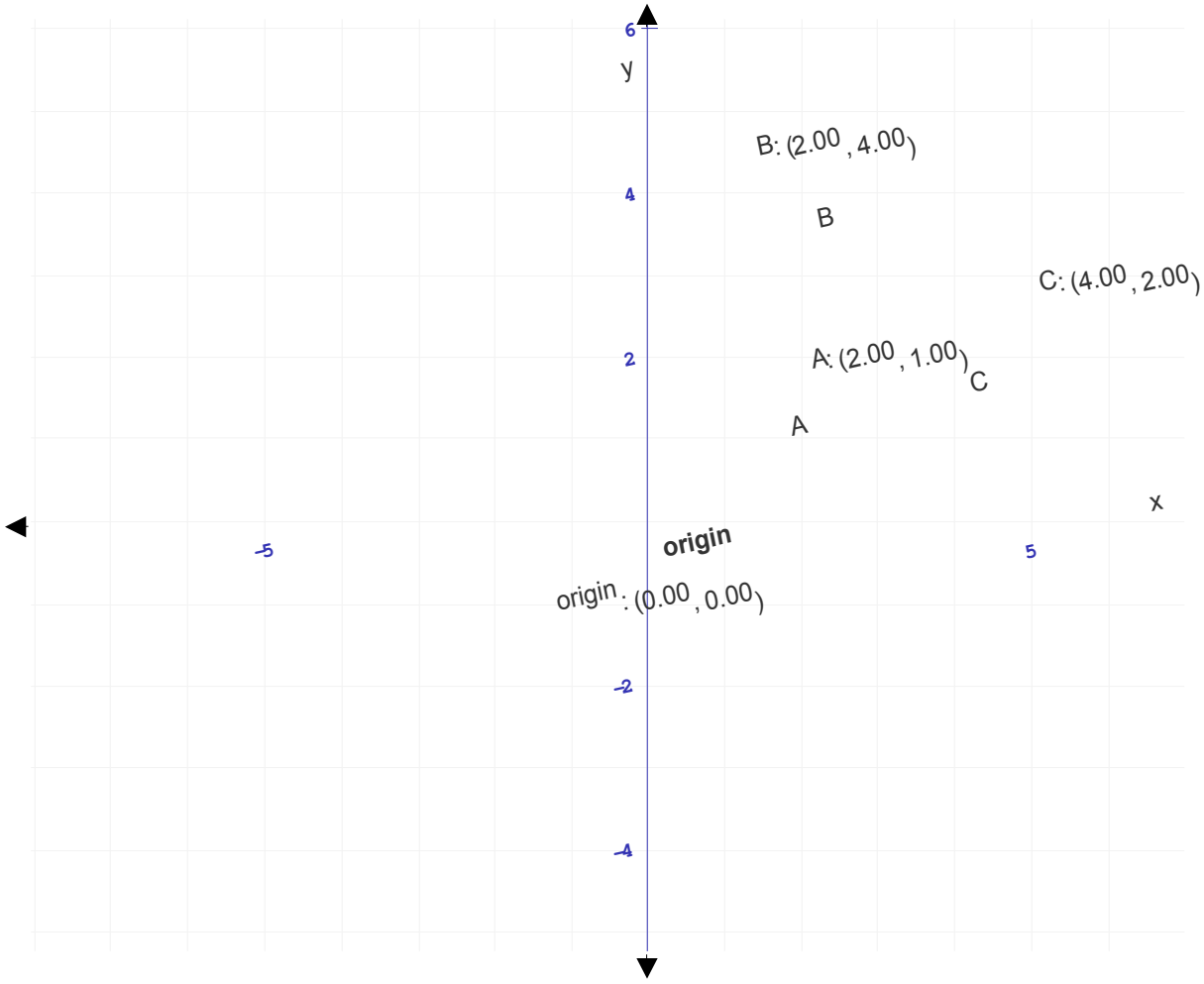
E. Closing Activity: (5 minutes)

- Every student will be called on to name a part of the coordinate graph. This will be a class quiz grade.

F. Assignment/Purpose:

- **Assignment:** Students will draw a coordinate graph, label, and plot ordered pairs. Making geometric figures, they will then be asked to find the perimeter. The assignment will give two points of reflection and students will have to find the other two and then come up with a rule.
- **Purpose:** The students will review plotting ordered pairs, along with observing where the perimeter formulas comes from. This assignment will also introduce reflections, which will be a topic taught later.

Example of a coordinate graph using GSP.


6
y
B: (2.00 , 4.00)
4
B
C: (4.00 , 2.00)
2
A: (2.00 , 1.00)
C
A
x
-5
origin
5
origin : (0.00 , 0.00)
-2
-4

Day 1 Notes

1.) Give students graph paper and with little instruction have them label as many parts of a coordinate graph.

2.) Then with the GSP program have students volunteer to come up and use GSP to label the coordinate plane. Only give simple instructions that will guide them.

3.) The objective is to see if they can label all of the parts without instruction. If not make sure the following are labeled: Origin, x-axis, y-axis, number lines (with arrows at each end), and the four quadrants.

4.) It is very important for students to understand the number lines, and where the numbers are to be placed.

5.) When using GSP to have students discover which coordinate is the x-value and y-value give examples of ordered pairs that demonstrate that the x and y-values are not commutative. (Example $(5,8) \neq (8,5)$)

Coordinate Graphs

(Notes)

Why do we use coordinate Graphs?

1.

What two types of lines are involved with this type of graphing?

1.

2.

The x-axis and y-axis are **NUMBER LINES.

** Remember to choose a proper interval.

*Naming points as **ordered pairs.***

- An ordered pair describes each point on the graph.
  Example (2,1)

- When a pair of numbers is being graphed as a **point,** the numbers are placed in **_____**with a**_____**in between them Example: **(**a,b**)**

- The symbol **(a,b)** is called an_____ **_____. Where Order matters.**
  Would (2,4)=(4,2). Yes or No

  - Here **a** is called the_____, also referred to as the_____.
    And **b** is called the_____, referred to _____.

  - The symbol (a,b) is going to stand for numbers.
    Example: (3,2) a=3 and b=2

Naming the different parts of a coordinate graph.

- First you have the **horizontal** and **vertical** lines, which are referred to as the _____and _____respectively.
- Where the x-axis and y-axis **intersect** this is called the **origin**, which is located at **(0,0).**

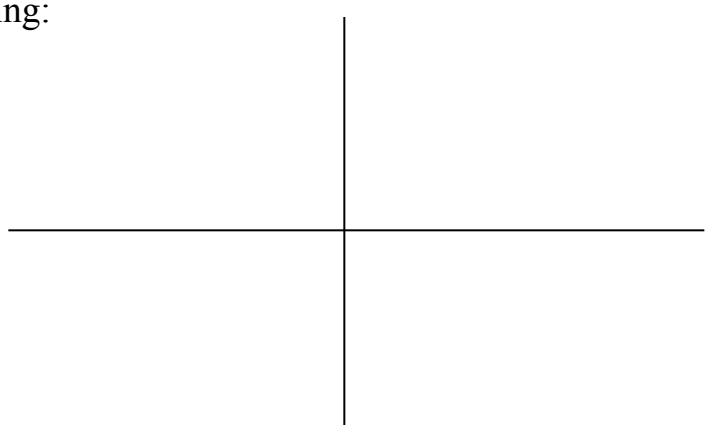
Remember! (0,0) Is called the origin

- When you use a **variable** for one of the coordinates it is customary to use___**,** for first coordinate and ___for second coordinate.

Review

- Horizontal line is _____.
- Vertical line is _____.
- The x-axis and y-axis intersect at the _____**.**
- **The origin has the <u>coordinates_____.</u>**

- The coordinate graph system also has _____quadrants. They are the following:



Teachers Notes

Why do we use coordinate Graphs?
some data have several pairs of numbers. Here a bar graph would not be useful

Look at Example 1(pg 422)

- What two types of lines are involved with this type of graphing?
  1. Horizontal line -> x-axis

  2. Vertical line -> y-axis

The x-axis and y-axis are **NUMBER LINES.
** Remember to choose a proper interval.

*Naming points as **ordered pairs.***

- An ordered pair describes each point on the graph.
  Example (2,1) (Teacher will show this on a coordinate plan)

- When a pair of numbers is being graphed as a **point,** the numbers are placed in Parenthesis
  Example: (a,b)

- The symbol **(a,b)** is called an Ordered Pair Where order **matters.**
  Would (2,4)=(4,2). Yes or **No**

- Here **a** is called the First coordinate , also referred to as the **x value.**
  And **b** is called the **second coordinate** referred to **_y-value.**

- The symbol (a,b) is going to stand for numbers.
  Example: (3,2) a=3 and b=2

Naming the different parts of a coordinate graph.

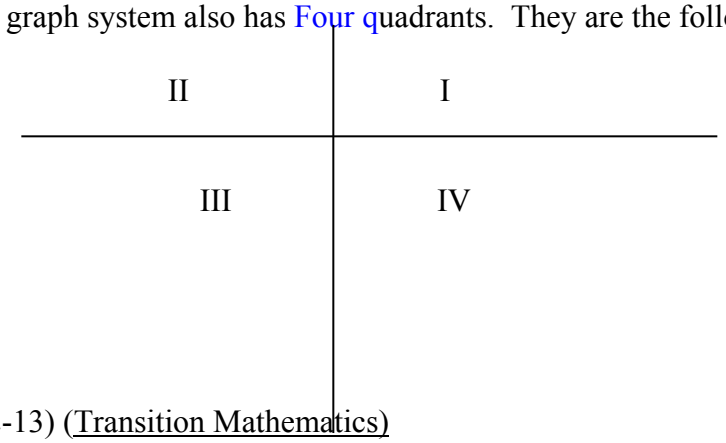
- First you have the **horizontal** and **vertical** lines, which are referred to as the **_x-axis** and Y-axis respectively.
- Where the x-axis and y-axis **intersect** this is called the **origin**, which is located at **(0,0).**
  Remember! (0,0) Is called the origin.
- When you use a **variable** for one of the coordinates it is customary to use**_x_,** for first coordinate and **Y** for second coordinate.

Review

- Horizontal line is _____.
- Vertical line is _____.

- The x-axis and y-axis intersect at the origin
- **The origin has the coordinates (0,0)**

The coordinate graph system also has Four quadrants. They are the following:



Class activity- Pg 425 (2-13) (Transition Mathematics)

Answers (PG 425, 2-13)

2.) B
3.) E
4.) P
5.) C
6.) I
7.) H
8.) R
9.) F
10.) K
11.) Q
12.) L
13.) M

Name_____
Assignment 1 coordinate graphs Date_____

Plotting Ordered Pairs

Exercise 1:

1.) Label the Origin
2.) Label the X-axis and Y-axis
3.) Label the number lines
4.) Which of the ordered pair represents the X- value, and the Y-value? (a,b) a=_____ b=_____
5.) Label the four quadrants
6.) Plot the following ordered pairs:
    Let A=(2,7)
    Let B=(7,7)
    Let C=(2,3)
    Let D=(7,3)
    Connect points A,B,C and D

    What type of geometric figure do you get?

    What is the perimeter?

    What are some of its properties?
    Example: All the angles are right angles.

Now draw the reflection of this figure. Make the reflection line the Y-axis.
Start with these ordered pairs, and see if you can find the rest.

A`=(-2,7)
B`=(-7,7)
C`=(,)
D`=(,)

What are some observations you have made?

Exercise 2:

1.) Label the Origin
2.) Label the X-axis and Y-axis
3.) Label the number lines
4.) Label the four quadrants
5.) Plot the following ordered pairs:

Let A=(0,-3)
Let B=(-1,-6)
Let C=(-6,-6)
Let D=(-5,-3)

Connect points A,B,C and D

What type of geometric figure do you get?

What is the perimeter?
What are some of its properties?

Now draw the reflection of this figure. Make the reflection line the Y-axis. Start with these ordered pairs, and see if you can find the rest.

A`=(0,-3)
B`=(1,-6)
C`=(,)
D`=(,)

Name____key_____

Assignment 1 coordinate graphs Date_____

Plotting Ordered Pairs

Exercise 1:

7.) Label the Origin
8.) Label the X-axis and Y-axis
9.) Label the number lines
10.) Which of the ordered pair represents the X- value, and the Y-value? (a,b) a=__x___ b=____y___
11.) Label the four quadrants
12.) Plot the following ordered pairs:

Let A=(2,7)
Let B=(7,7)
Let C=(2,3)
Let D=(7,3)

Connect points A,B,C and D

What type of geometric figure do you get? Rectangle

What is the perimeter? =18

What are some of its properties?

Example: All the angles are right angles.

These are what the students came up with: Opposite sides are equal and parallel

Now draw the reflection of this figure. Make the reflection line the Y-axis. Start with these ordered pairs, and see if you can find the rest.

A`=(-2,7)
B`=(-7,7)
C`=(-2,3)
D`=(-7 ,3)

What are some observations you have made?

A' is the same distance from the y-axis as A but on the other side
B' " " " " " " " " B " " " " "
C' " " " " " " " " C " " " " "
D' " " " " " " " " D " " " " "

Exercise 2:

1.) Label the Origin
2.) Label the X-axis and Y-axis
3.) Label the number lines
6.) Label the four quadrants
7.) Plot the following ordered pairs:

Let A=(0,-3)
Let B=(-1,-6)
Let C=(-6,-6)
Let D=(-5,-3)

Connect points A,B,C and D

What type of geometric figure do you get?
Parallelogram

What are some of its properties?
These are ones the students came up with: Opposite sides are equal in length (congruent)

Now draw the reflection of this figure. Make the reflection line the Y-axis.
Start with these ordered pairs, and see if you can find the rest.

A`=(0,-3)
B`=(1,-6)
C`=(6 ,-6)
D`=(5 ,-3)

Daily Plan

Date: Day 2 **Course:** 7th or 8th **Hour:** 42 min

A. Method:

- Through discussion, notes and hands-on with TI-83, student will learn how to plot points on a graphing calculator.

B. Student Objective(s):

- Students will be able to plot coordinate points using the TI-83 calculator and develop concepts associated with domain and range.

C. Opening Activity/Purpose: (5 minutes)

Activity: Students will write the **positive** factors of 18 as ordered pairs. (Overhead/worksheet)

Purpose: Students will apply something they have learned in the past to plotting ordered pairs.

D. Developmental Activities: (35 minutes)

- Students will be given a worksheet that will guide them through the process of putting their ordered pairs into lists and plotting them as a scatter plot on the graphing calculator.
- Students will examine concepts of domain and range through changing the windows of the calculator. (See teachers notes)

E. Closing Activity: (5 minutes)

- Class discussion on concepts of domain and range.

F. Assignment/Purpose:

- **Assignment:** Students will do the same thing with factors of 12,24,7,13. Then they will write in paragraph form their conclusion.

- **Purpose:** Review

Name_____

Worksheet on plotting with TI-83
Date_____

Overhead/worksheet

1) Write the **positive** factors of 18 as ordered pairs. The first one is done for you.
   (1 , 18)

   (,)

   (,)

   (,)

   (,)

   (,)

Now that we have written the factors of 18 in ordered pairs, we will plot the ordered pairs with our TI-83 calculators.

Follow the directions step-by-step to be able to plot the following ordered pairs with your calculator.

1) Turn on calculator
2) Hit the stat button
   Under edit, highlight number one and push enter.
3) Clear out lists L1, L2, L3 by highlighting their labels and pushing the clear button, then push enter.
4) Under L1 put the **first coordinate** of each **ordered pair,** make sure you hit enter after each number. (Example the first number in L1 would be 1)
5) Under L2 put the **second coordinate** of each **ordered pair**. (The first number should be 18)

L1 and L2 must be the same in length

You have put your data into lists, now we have to set up the plot screen.

6) Hit the 2nd key then y= (this is called stat plot)
7) Highlight plot one and hit enter (make sure all other plots are off before going to the next step)

8) Under the Plot 1 highlight on and hit enter **(***Make sure all other plots are off at this time***)**

9) Arrow down to type and highlight the first plot type and push enter. This is called a scatter plot.

10) Arrow down to Xlist and hit 2nd stat (which is the list key) and highlight L1 and push enter. You have now put L1 as your Xlist.

11) Arrow down to Ylist and follow as above but now put L2 as your Ylist.

12) Now arrow done to mark and choose which mark you would like to see when you plot your points.

13) Push the graph button and you will get your ordered pairs plotted.
**Make sure there are no equations under y= turned on at this time.

Are all your ordered pairs plotted??

If not you might have to change the window of your plot screen.

Hit window key and change your x-min, x-max, y-min, and y-max values. Now does all your ordered pairs show up??

Sketch your results on paper.

Homework: repeat these steps but now with factors of 12,24,17,13 and in paragraph form write out your conclusion. Make sure you show your work on paper for the factors, and remember to sketch your results

Name___Key_____

Worksheet on plotting with TI-83
Date_____

Overhead/worksheet (teachers notes and answers)

2) Write the positive factors of 18 as ordered pairs. The first one is done for you.
(1 , 18)

(2 , 9)

(3 , 6)

(18, 1)

(9 , 2)

(6 , 3)

Now that we have written the factors of 18 in ordered pairs, we will plot the ordered pairs with our TI-83 calculators.

Follow the directions step-by-step to be able to plot the following ordered pairs with your calculator.

10) Turn on calculator
11) Hit the stat button
Under edit, highlight number one and push enter.
12) Clear out lists L1, L2, L3 by highlighting their labels and pushing the clear button, then enter.
13) Under L1 put the **first coordinate** of each **ordered pair,** make sure you hit enter after each number. (Example the first number in L1 would be 1)
14) Under L2 put the **second coordinate** of each **ordered pair**. (The first number should be 18)

L1 and L2 must be the same in length

You have put your data into lists, now we have to set up the plot screen.

15) Hit the 2nd key then y= (this is called stat plot)
16) Highlight plot one and hit enter (make sure all other plots are off before going to the next step)

17) Under the Plot 1 highlight on and hit enter **(***Make sure all other plots are off at this time***)**

18) Arrow down to type and highlight the first plot type and push enter. This is called a scatter plot.

10) Arrow down to Xlist and hit 2nd stat (which is the list key) and highlight L1 and push enter. You have now put L1 as your Xlist. (or you can just hit 2nd 1 for L1)

11) Arrow down to Ylist and follow as above but now put L2 as your Ylist.

12) Now arrow done to mark and choose which mark you would like to see when you plot your points.

13)Hit the graph button and you will get your ordered pairs plotted.
**make sure there are no equations under y= turned on at this time.

Are all your ordered pairs plotted??

If not you might have to change the window of your plot screen.

Hit window key and change your x-min, x-max, y-min, and y-max values. Now does all your ordered pairs show up?? (or you can go under zoom key and hit #9)
**This is a good time to talk about domain and range.

Domain- is the x values in your ordered pair.
Range- is the y values in your ordered pair.

Sketch your results on paper.

☆ Homework: repeat these steps but now with factors of 12,24,17,13 and in paragraph form write out your conclusion. Make sure you show your work on paper for the factors, and remember to sketch your results

**This exercise will teach students how to plot points on the calculator and begin to develop concepts associated with domain and range. The teacher can have the students change their windows, looking at what quadrant are x and y values positive? What quadrant are x and y value negative? What quadrant is x value positive and the y value negative and visa versa?

Daily Plan

Date: Day 3 **Course:** 7th or 8th **Hour:** 42 min

A. Method:

- Through discussion, notes, and group work student will learn about horizontal and vertical translations.

B. Student Objective(s):

- Every student will demonstrate the knowledge of a vertical and horizontal translation by successfully completing a worksheet.

C. Opening Activity/Purpose: (3 minutes)

- **Activity:** The teacher will take a geometric figure that is on a coordinate plan and move it horizontally and vertically**,** demonstrating the new concept of horizontal and vertical translations.
- **Purpose**: Have students observe that the pre-image and image are congruent.

D. Developmental Activities: (35minutes)

- Students will be in groups of two completing worksheets on horizontal and vertical translations.
- Through class discussion teacher will go over worksheets and then notes on transformations. (On the overhead)

E. Closing Activity: (4 minutes)

- Answer any questions students might have.

F.) Assignment: Problems out of the textbook (Transition Mathematics) Pg. 437 (1-12).

Purpose: A review of concepts and vocabulary learned in class.

Name:_____

Plot the following points:

A(-8,8) B(-8,5)
C(-4,5) D(-4,8)

Connect the points. (Place coordinate graph paper here before copying)

What Shape did you get?

Now take your shape and move each point 3 units to the right. What are the coordinates of your new points?

A'(,) B'(,)
C'(,) D'(,)

What is happening to the (X,Y) Values?

What type of translation or slide is this?

Name:_____

1.) On the graph below label the following: **Origin, X-axis, Y-axis, all quadrants, and the number lines.**

2.) Plot the following points:

A(1,2) B(4,2)
C(3,4)

Connect the points. (Place coordinate graph paper here before copying)

What Shape did you get?

Now take your shape and move each point 3 units up. What are the new points' coordinates?

A'(,) B'(,)
C'(,)

What is happening to the (X,Y) Values?

What type of translation or slide is this?

Name:__Key_____ Homeroom_____

Plot the following points:

A(-8,8) B(-8,5)
C(-4,5) D(-4,8)

Connect the points. (Place coordinate graph paper here before copying)

What Shape did you get? Rectangle

Now take your shape and move each point 3 units to the right. What are the coordinates of your new points?

A'(-5, 8) B'(-5, 5)
C'(-1, 5) D'(-1,8)

What is happening to the (X,Y) Values? You add 3 to each x value and the Y value stays the same.

What type of translation or slide is this? Horizontal

Name:_____KEY_____ Homeroom_____

1.) On the graph below label the following: **Origin, X-axis, Y-axis, all quadrants, and the number lines.**

2.) Plot the following points:
A(1,2) B(4,2)
C(3,4)

Connect the points. (Place coordinate graph paper here before copying)

What Shape did you get? Triangle

Now take your shape and move each point 3 units up. What are the new points' coordinates?
A'(1,5) B'(4, 5)
C'(3, 7)

What is happening to the (X,Y) Values? X values are staying the same, and you are adding three to each y value.

What type of translation or slide is this? **Vertical**

Types of Transformations

What does the word transformation mean?
Changed or moved

Three ways that geometric figures can be transformed without changing its size:

1.) **Translations or slide**
2.) **Reflections**
3.) **Rotations**

Translations

When you place a geometric figure on a grid, you can plot the vertices on the graph, and then when you add **the** same number **to the coordinates of the** points **your image is a translation of the pre-image. This also can be referred to as a** slide image**.**

The original image is called the pre-image **and the translated figure is called the** image. **(Teacher will demonstrate a horizontal translation on a grid)**

This is called a **Horizontal translation** or **Horizontal slide.**

Notice: When you make a translation with a geometric figure, your **pre-image** and **image** are **Congruent.**

Congruence- means the figures have the same size and same shape.

An image can be made up of several translations of a pre-image.
(Demonstration on coordinate grid)

What do you think a vertical translation is?

Answers (PG 437, 1-12)

1.) Shifts 3 units to the right.
2.) Shifts 10 units up
3.) Shifts 7 units down
4.) Shifts 6 units to the left
5.) Translation
6.) Pre-image, image
9.) Point shifts k units to the right
10.) Point shifts h units to the left
11.) Shape, size
12.) True

Daily Plan

Date: Day 4 **Course:** 7th or 8th **Hour:** 42 min

A. Method:

- Using GSP to plot points, students will make a battleship game to be played during class.

B. Student Objective(s):

- Each student will review terminology and concepts on coordinate plans, and horizontal and vertical translations.
- Each student will use GSP to make a battleship game board.

C. Opening Activity/Purpose: (3 minutes)

- **Activity:** Hand out instructions for using GSP.
- **Purpose**: Students can use program for the activity.

D. Developmental Activities:

1.) Students will work in groups of two on the computers to make their battleship game board. (15 minutes)

2.) Students will pick a new partner to play the battleship game. (25 minutes)

E. Closing Activity: (4 minutes)

- Have students finish their game.

F. **Assignment:** Read pg 440-441 in the Transition Mathematics textbook, on reflections

(Day 5) Students will play other two game boards at home.

Purpose: Students are reviewing terminology and concepts by teaching someone else how to play the game.

Teachers notes day 4

This lesson reviews many of the concepts learned with coordinate graphs, and lets the students explore further with the GSP program.

- The students will have to decide what quadrants to plot there points in and then come up with ordered pairs that will be in that quadrant.
- They will also continue to discover what is happening to the x-coordinate and y-coordinate when they are moving in a horizontal or vertical direction.
- Another important concept is how they are verbalizing the ordered pairs to their opponent. The teacher needs to circulate around the room and make sure that the students have the right concepts when playing the game.
- Make sure the students are keeping track on their graph what ordered pairs they have already guessed.
- To shorten the game, you might restrict the points to be only in two quadrants.

Instructions for making battleship game board

1.) Open the GSP program (students are in groups of two)
2.) Under the graph window, select grid form and select square grid. (You can drag your graph if you highlight one of the axes and hold the mouse key down).
3.) Now you need to plot your points, read the following instructions very carefully!!!
    - You are going to create battleships out of plotted points. You will have a 5-point battleship, 3-point battleship and a 2-point battleship.
    - The 5-points battleship must be in a vertical or horizontally line. They also must be plotted together.
    - The same with the 3-point and 2-point battleships.
    - Look at your coordinate graph and decide where you are going to place your ships and write the ordered pairs on a sheet of paper.
4.) Under the graph window, go to plot points
5.) There should be a circle next to the word rectangular. Then below that there are parentheses and two boxes. The first box you put the x-coordinate and the second box you put the y- coordinate. Then you select plot. Do this for each of your ordered pairs and with your last one select done.
6.) You should see your points plotted on the graph.
7.) Now for each battleship you are going to draw a line segment through their points.
    - First highlight just the points for the 5-point ship. Then under the construct menu choose segment. You will have a segment drawn through your 5-points.
    - Do the same thing for your 3-point and 2-point battleships.
    - After you complete your three ships, you are going to make each ship a different color.
8.) Highlight the line segment and go under the display menu and go to color and pick a color. Do this for your other two ships.
9.) Now you are finished, print your game board.
10.) Each person needs to make three game boards. Follow the same steps to make your partners game board.


Day 4
Example of a 5-point, 3point, and 2-point battle ship.
10
8
6
4
2
-5
5
10

Rules for Battleship game

1.) Students will be in groups of two. His/her opponent should not see their board.

2.) The youngest student will go first. (Player #1)
- Player #1's object is to guess the points where his/her opponents battleships are located.
- Player #1 names an ordered pair. Player #2 responds with the words hit or miss. If it is a hit, Player #1 puts an X on his board. If not, he/she puts a circle.

3.) Player # 2's turn, same process, he/she asks player #1 about an ordered pair. Player #1 responds with hit or miss.

4.) The object is to find your opponents battleships and sink them, and whoever does first is the winner.

5.) If your opponent sinks one of your ships you need to let them know.

Daily Plan

Date: Day 5 **Course:** 7th or 8th **Hour:** **30** min

G. Method:

- Through discussion and hands-on activities students will further their knowledge on lines of reflection and geometric figures.

B. Student Objective(s):

- Each student will demonstrate how to reflect a figure over a line of reflection using a Mira by completing the worksheet successfully.

C. **Opening Activity/Purpose:** (3 minutes)

- **Activity:** discussion of the proper use of a Mira.
- **Purpose**: Students will be able to use the Mira to reflect figures.

D. **Developmental Activities:** (20 minutes)

- Students will work in groups to complete a worksheet on reflections using a Mira.

E. **Closing Activity:** (7 minutes)

- Class discussion about what stayed the same when the figure was reflected and what changed.

E.) Assignment: Students will play other two game boards made on day 4 at home.

Purpose: Students are reviewing terminology and concepts by teaching someone else how to play the game.

Day 5 notes

1.) Have students reflect each point and then take a straight edge and connect the points

2.) Properties that stayed the same after reflection

- Distance, area, size, shape

Properties that changed

- Orientation

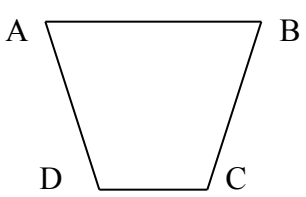
Using a Mira for reflections

Name_____

Date_____

Take each figure and reflect it over the line of reflection using the Mira.

1.)



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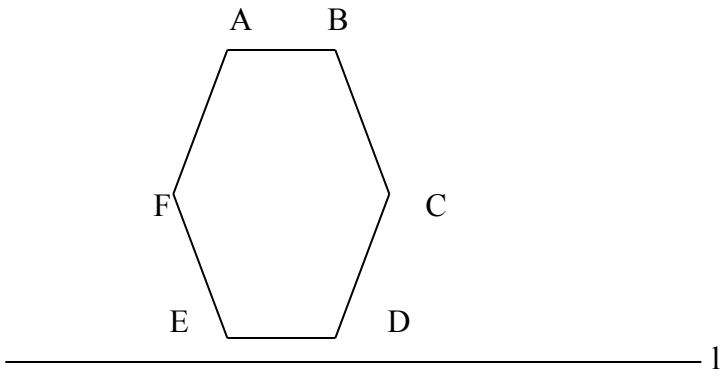
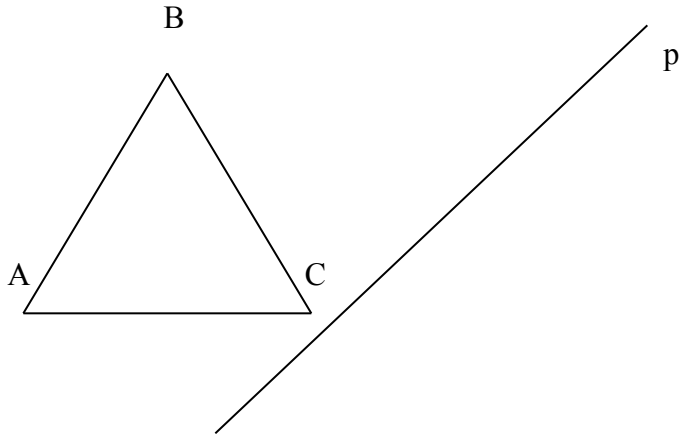
2.)



3.)



**On the back of this paper write down things that changed when you reflected your figure and things that stayed the same.