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Graphing Equation Lines

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Jessica Phillips
NAS 501

Math 8 Lesson using the Connected Math textbook, Moving Straight Ahead: Investigation 3 for a block schedule (80 minute class)

Objectives:

How do you use the TI graphing calculators to graph lines from equations?

What are the advantages and disadvantages of using a graphing calculator to answer questions about linear relationships?

Key Idea:

According to the New York State Standards for Mathematics, students will be working with the Key Idea of Modeling / Multiple Representation. They use modeling and multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships.

Lesson:

After beginning the class with a brief review assignment (bell work) for about 10 minutes, I will begin to introduce the lesson using the TI graphing calculators. The students will have prior knowledge of graphing lines and have seen me use the graphing calculator with the view screen. Then the students will be placed in groups of three or four. Each group will use a TI graphing calculator.

To start, as a whole class, we will review the calculators by graphing a line, finding the graph menus and buttons they will need to use throughout the lesson. Each student in the group will take brief turn using the calculator. Then the group will decide who will be using the calculator during the work time. Each student will receive a handout to lead them through the activity (attached). I will review the directions and expectations for the work time and answer any questions they may have. We will start to walk through Graph #1 as a class. I will start the activity on the graphing calculator using the view screen and leave it up as a silent reminder. After using about 15 minutes as an opening, the students will begin their work in their groups. I will monitor their progress by walking around the room and checking on each group. I will be looking for each group to be making progress through the activity, and for each member of the group to contribute to the discussion. As I continue to monitor the students' work, I will be looking for them to use the functions on the graphing calculators properly. They should use at least four functions to help answer the questions on the handout. The students will have about 30 minutes to complete the handout. I use a timer to stay on schedule, and it also helps get the students' attention.

At the end of the work time, I will get the class's attention with approximately 15 to 20 minutes left. We will begin summarizing the students' findings in the lesson. On a half sheet of paper, each student will answer the following question: what are some of the advantages and disadvantages of using a graphing calculator to answer questions about linear relationships? I will ask for some students to volunteer their results with the class. We will review some of the answers on the handout and discuss the use of the graphing calculator. I will be collecting the completed handout and the closing activity from every student. All of the other materials (graphing calculators) will also be collected at this time.

Rubric: The student's class work grade will be determined based on the following rubric. The students will be aware of this rubric, and it will be posted for them to refer to.

5: Worksheet is completed accurately and completely. Group was on task 90 – 100 % of the work time. Every student in the group contributed to the activity and used the calculator properly.

4: Worksheet is completed and almost accurate. Group was on task 75 – 90 % of the time. Every student in the group contributed to the activity and used the calculator properly.

3: Worksheet is almost completed and almost accurate. Group was on task 50 – 75 % of the time. Every student in the group contributed to the activity and used the calculator properly the majority of the time.

2: Worksheet is almost completed and not accurate. Group was on task less than 50% of the time. Students did not contribute to the activity equally and did not use the calculator properly.

1: Worksheet is not fully completed, and what is done is incorrect. Student did not equally participate in his/her group. Group / student was not on task for a significant amount of time and did not use the calculator properly.

0: The student refused to participate in the activity.

Name _____
Moving Straight Ahead

Date: _____
Investigation 3

Other Group Members: _____

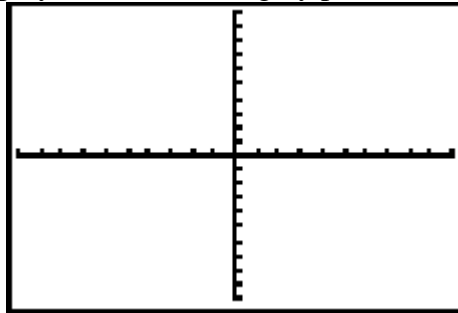
Class Activity: Fill in the answers in the space provided. Work cooperatively with your group and each student is expected to turn in his/her own paper.

Graph #1

Input equation $y = 2x + -1$.

Go to Zoom (gray button) and then press 6 (ZStandard).

Sketch what you see in the display on the following xy plane.



Press 2nd Graph (gray button) to display the table. Copy any 5 points from the table here:

X	Y

At what point does the line cross the y axis? (,) What is that point called? _____

At what point does the line cross the x axis? (,) What is that point called? _____

Is the point (-3, 4) on the line? _____ (Remember, there are several different ways to find points on the line.) How do you know? _____

Is the point (15, 29) on the line? _____ How do you know? _____

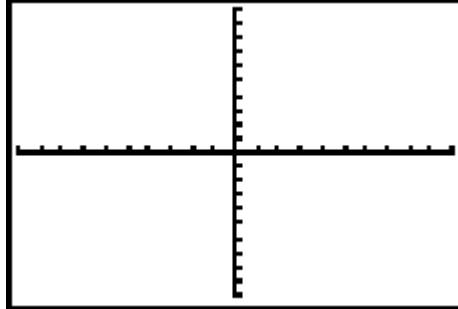
Graph #2

Clear out the previous equation.

Input equation $y = -1/2 + 3$.

Go to Zoom (gray button) and then press 6 (ZStandard).

Sketch what you see in the display on the following xy plane.



Press 2nd Graph (grey button) to display the table. Copy any 5 points from the table here:

X	Y

At what point does the line cross the y axis? (,)

At what point does the line cross the x axis? (,)

Is the point (-2, 4) on the line? _____ How do you know? _____

Is the point (16, 10) on the line? _____ How do you know? _____

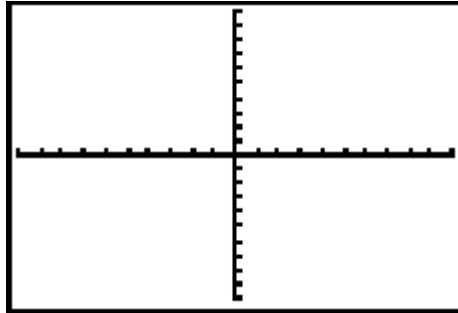
Graph #3

Clear out the previous equation.

Input equation $y = 4 + x$.

Go to Zoom (gray button) and then press 6 (ZStandard).

Sketch what you see in the display on the following xy plane.



Press 2nd Graph (grey button) to display the table. Copy any 5 points from the table here:

X	Y

At what point does the line cross the y axis? (,)

At what point does the line cross the x axis? (,)

Is the point (-13, -17) on the line? _____ How do you know? _____

Is the point (-3, 1) on the line? _____ How do you know? _____

Answer the following questions on the back of the paper in *complete sentences*.

1. Describe at least 2 different ways that you can determine if a point is on the given line.
2. What is something that graph #1 and #3 have in common?
3. What is something that graph #2 and #3 have in common?
4. How do you know that all 3 graphs are linear relationships?
5. Rank your group on a scale of 0 (lowest) to 5 (highest). How do you think your group did? What can you tell me to back that up?