

Lesson Title: Race Graph

Unit Title: Graphing Linear Equations and Functions

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Subject, Grade Level, and Date: Algebra 1, 9th – 12th grade, February 02, 2017

Placement of Lesson in Sequence and Lesson Rationale

This is the fourth lesson in the Graphing Linear Equations and Functions Unit. The Unit will be taught slightly different from the order in the textbook to differentiate instruction for the English Language Learners in the class. This class consists of 25 students who 12 do not speak or read any English. In this class, students are not at grade level math and thus lack many of the basic skills for Algebra 1. For this unit, the focus will be building student knowledge to be able to graph linear equations. Before this lesson, students learned for to solve for 'y,' make T-Charts which included plotting points in a coordinate plane, as well as finding x and y-intercepts to graph simple linear equations. Students will bring together the knowledge they have previous acquired and build upon it to learn the "short-cut" to graphing slope-intercept form.

Central Focus and Purpose

The Central Focus is: Students will be able to solve a linear equation for y and identify the slope and y-intercept of a linear equation as well as when an equation is graphed. Once being able to identify the two pieces of information be able to quickly graph lines. As well as deepen their understanding of slope of a line by being able to explain how changes in the slope affect the steepness and direction of a line. The purpose of students being able to master these skills is to deepen their understanding of graphing linear equations by providing a quicker method to graphing. Students will understand that making a T-chart or finding x and y-intercept can be time-consuming while using the slope-intercept form is more efficient. All this building their skills for the second unit which will focus on students being able to determine functions and work with modeling direct variation and find the slope and rate of change.

CCSS.MATH Content and Practice Standards

- CCSS.MATH.CONTENT.8.F.A.3
Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.
- CCSS.MATH.CONTENT.HSA.SSE.A.1.A
Interpret parts of an expression, such as terms, factors, and coefficients.
- CCSS.MATH.CONTENT.HSA.SSE.B.3
Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- MP.1 Make sense of problems and persevere in solving them.
- MP.4 Model with mathematics.
- MP.5 Use appropriate tools strategically.
- MP.6 Attend to precision.

Prior Content Knowledge and Pre-Assessment

Students will need mastery of:

1. The definition of a term, variable, slope, intercept, x-axis, and y-axis
2. Make T-Charts to learn how to plot coordinates on a graph
3. Solving for a specific variable (in this lesson students will solve equations for y)
4. Finding x and y-intercepts and how to use them to graph.

The pre-assessment for the mastery of these skills will be done on an entry task quiz where students will be asked to demonstrate all the previously mentioned prior content. This assessment will be presented on a handout that will be both in English and Spanish to accommodate for the EEL students.

Learning Target(s) and Plan for Clarifying Intending Learning

1. Students will learn to write and graph equations in slope-intercept form. (Estudiantes aprenderan a escribir y a ser un grafico de ecuaciones en form de pendiente-interseccion: $y=mx+b$)
2. Students will be able to solve a linear equation for y and identify the slope and y-intercept as they will recognize it is in slope-intercept form.
3. Students will be able to graph lines using the slope and y-intercept.
4. Students will deepen their understanding of how changes in the slope of a line affect the steepness and direction of a line.

I will provide examples that will be completed as a class to ensure that the intended learning is clarified and that all students understand the concept of the lesson. During this time students, will be able to ask any questions, they may have or confusion areas to seek clarification. There will be plenty of examples for students to complete during the guide practice time to fill in gaps in their understanding. The exit ticket will be a tool for students to show their understanding of the academic language as well as reflect on their learning of the lesson.

Strategy for using assessments to guide student learning

The purpose of having the students work with each other to complete the in-class examples is for students to have instant feedback from their peers. Through the discussion with peers, the students will be able to identify their misunderstandings and be able to address them between peer to peer discussion or seek the teachers help in clarification. Using an exit ticket will allow each student to independently demonstrate their understanding of the learning targets and provide me with the information to evaluate if the students were successful in this lesson or need a second lesson on the topic.

Success Criteria (Criteria for interpreting student success of the learning target)

1. Entry task is complete with full understanding. Pre-assessment to determine students have the necessary skills for the lesson.
7 Points possible
 - a. Question 1:1 pt. Solving for y
 - b. Question 2:1 pt. Making T-chart,
1 pt. correctly plotting points on the coordinate plane.
 - c. Question 3: 1pt for finding x-intercept, 1 pt. for finding the y-intercept, 1 pt. for correctly plotting x and y-intercepts, and 1 point for connecting points to form a line.
2. In-class guide practice which will be done as a little competition between the students and me. I will make a

Plan for providing feedback and students' monitoring of their own learning

Class discussion will occur during the entry task and throughout the entire lesson to ensure students can have the opportunity to self-asses. I will walk around the classroom and monitor the students' progress and provided immediate feedback if the students seem to be off task. Students will know based on classroom standards of what is expected for their level of engagement during the lesson and will be given their daily participation points according to those standards. (See attached participation rubric). I will be providing feedback throughout the lesson by asking student questions during the class discussion the students will also self-assess (exit card). I will also provide immediate feedback as we work through examples and present solutions as a class. Lastly grading the exit ticket will allow me to determine if the class met the target or if a second lesson is needed. My feedback will occur directly on the worksheet that the students will receive first thing

deal with the students, and that is the if five out of the 25 students can beat me at graphing any of the equations they will not have any homework.

This will be done before I present slope-intercept form as a short cut to graphing. This will be graded on the participation rubric attached at the end as all I am seeking is student involvement in learning new content.

3. Exit Ticket will be the most valuable for me to interpret student success about learning targets. In this exit card, I will have students tell me privately how comfortable they feel with the content of the lesson. The students will also directly tell me what areas of the lesson they need clarification to successfully met the learning targets.
 - a. Four question each 5 points.
 - i. 1 pt. for showing work
 - ii. 1 pt. for identifying slope
 - iii. 1 pt. for identifying y-intercept
 - iv. 1 pt. for graphing the points for the y-intercept and slope.
 - v. 1 point for making a line connecting the points.

4. Reflection which will consist of three questions for students to reflect on their understanding of the lesson. One point each for responding included in the Exit ticket.

*The exit ticket will be graded after class to collect concrete data of student understanding of learning targets. When grading the exit ticket, I will look to see that all the students receive at least an 80% (18/23) of correct problems to be able to move on to the next part of the unit. If more than, 20% of the students do not meet the 80% benchmark, I will have a follow-up lesson the next day to build student understanding and begin to introduce the next concept by

when they come to class the next day. Based on their results if a review lesson is needed I will use the problems on the worksheet to be my template for the next lesson.

building off each material.	
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Academic Language Demands		
Language Function	Vocabulary & Symbols	Secondary Language Demand
<ul style="list-style-type: none"> • The language function for this lesson is interpret. Students will be able to interpret parts of the equation $y=mx+b$ that is be able to identify the slope and y-intercept and interpret these values represented in a graph. 	<ul style="list-style-type: none"> • Slope (Pendiente de la linea) • Y-intercept (Intercepcion y) • Linear equations (ecuacion linear) • Graphing (grafico) • $y=mx+b$ Slope-intercept Form (forma de pendiente-interseccion) 	<p>Mathematical Precision: Students must have correct steps to solving equations for y to step them up in correct slope-intercept form. Students will interpret each equation to correctly identify the slope and y-intercept to be able to correctly graph each linear equation quickly and effectively.</p> <p>Syntax: Students must use correct math operations to correctly solve for y to be able to acquire the correct pieces of information to be able to correctly graph each linear equation.</p> <p>Discourse: The lesson will be presented as a competition where students will be against the teacher. During the competition to see who can graph the equations faster, students will be encouraged to discuss and work together to be able to be successful. All students must be able to clearly explain their process to graph each equation. Students must also discuss with each other to try to figure out how it is I can graph each equation before them. During this activity as a class, we will begin to use correct vocabulary so that students can identify the vocabulary in their exit ticket.</p>

Language Support (instructional and assessment strategies)		
Language Instruction	Guided Practice	Independent Practice
Using the new or unfamiliar vocabulary words in the lesson, the teacher will explain any unclear vocabulary concepts as needs arise. The greatest language demand in this lesson is the heavy reliance on discourse. The teacher will model effective speech and discussion throughout the lesson by providing reasoning for all answers and asking guiding questions to encourage students to provide deeper explanations.	Throughout the competition activity, students will work in partners to be able to graph linear equations and be able to explain their reasoning to their partner. The class will consist of working on sample problems in which we will work on each one individually. I will allow time for students to work and discuss then I will bring the class back together to present solutions. Through this process, I will answer any questions that come up as well as have students justify their solutions. I will also ask questions throughout the guided practice time to help students discover the slope-intercept form. Sample questions: <ol style="list-style-type: none"> 1. If the slope is negative/positive what does this tell us about the graph of this line? 2. If you know the y-intercept what can you tell about the graph? 	Students will work individually on their exit ticket to demonstrate their knowledge of the content and be able to express areas of concern they may have.

Differentiation, Cultural Responsiveness, and Accommodation for Individual Differences

Being a part of a community where about 94% of the population is Hispanic, of a Mexican background I am aware that this is the cause of the large percentage of English Language Learners in the class. In this class, there are 25 students of which half do not speak or read any English, and the other half is bilingual and one native English speaker. Therefore, I will have a bilingual class in which I will present the material in English and Spanish as well as have my handouts in both languages. I allow and encourage my students to converse in their native language, Spanish, during the group discussions or group work time. I speaking Spanish has proved to be beneficial when helping students in my class understand the material because I have been able to see that when explaining a concept in their native language and then having them explain to me the same concept in English gives the students a much higher level of understanding. And not only understanding but also when having the students do this they can keep the information for much longer periods. When encouraging the students to discuss in their native language, I am trying to push the students out of their comfort zone and even if they cannot get their ideas out in English at least having them express their ideas in Spanish is one more step in their learning. Blanco (1977) notes that the consensus of experts in the field of bilingual education is that its primary goals are to cognitive and affective development rather than linguistic and cultural realms. From this, one could surmise that the primary goal of bilingual education is not necessarily to teach English or a second language but

to teach children concepts, knowledge, and skills through the language they know best and reinforce this information through the second language.

Materials – Instructional and Technological Needs (attach worksheets used)

Whiteboard, Expo markers, Entry Task and Exit Ticket handouts (see attachments), Notebook paper for notes, pencil with erasers, and thinking mentality.

Instructional Plan (detailed explanation for thing the lesson)

Pacing	Teacher Activities	Student Activities
10-15 min.	After students complete the Entry Task quiz I will review the problems to make sure students have a basic understanding of the concepts need for the success of this lesson	Pre-Assessment: Students will work individually to complete the handout titled: Entry Task/Primer Tarea. After completion students will participate in class discussion to review student response to their handout. Students randomly will be chosen to present their solutions on the whiteboard.
25-30 min.	<p>Must stop at 10 AM</p> <p>Introduce Competition: “Today we will review how to graph linear equations, I will make a deal with you. “If five out of the 25 students in the class can beat me at graphing any of the equations we will have no homework tonight” Translate to Spanish. We will go through <u>4 samples</u>, and ideally, no student will be able to beat me. Leading to the introduction of slope-intercept form $y = mx + b$. After graphing all four sample equations, I will ask students, “Do you guys want some help to be able to beat me to avoid homework?” “What do you notice about the equations we have graphed this far? “This form is called “Slope-intercept form” which is $y = mx + b$. This form gives you all the information you need to graph. Let’s go through the graphs we have done already and identify the slope and y-intercept. And review how we will use the information to graph. (See attachment titled “Lesson Sample Problems” for graphs done in class. “Do you guys want a second chance at beating me?” Tell me the slope and y-intercept of each equation. Let’s look at these last two graphs, what do you notice about the graphs? <ul style="list-style-type: none"> If the slope is </p>	<p>Students will partner up as I will offer that advantage in the competition. One by one each student will graph the following using any method they know to graph linear equations.</p> <p>Samples:</p> <ol style="list-style-type: none"> $y = 4x + 2$ $y = -x + 6$ $y = 2x - 4$ $y = \frac{1}{4}x$ <p>Students should respond that all equations have the same format all equal y and the next term is the x. Students should take notes: m=slope=el pendiente de la linea, b= y-intercept= intercepcion y (where the line crosses the y-axis).</p> <ol style="list-style-type: none"> m=4, b=2 (0,2) m=-1, b=6 (0,6) m=2, b=-4 (0, -4) m=1/4, b=0 (0,0) <p>Samples #2: $y = 2x + 4$ $y = x + 1$</p> <p>Challenge Problems (Students must solve for y) $x + 2y = 8$ $2y + 6 = 3$</p>

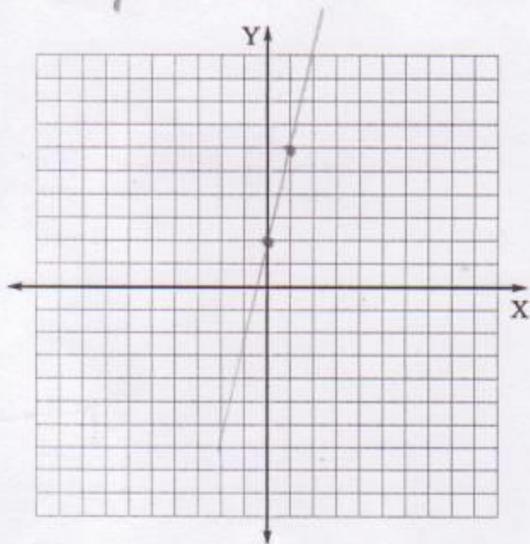
	<p>negative/positive what does this tell us about the graph of the line?</p> <ul style="list-style-type: none"> If you know the y-intercept what can you tell about the graph? <p>If time allows going over more problems: $2x + 8y = -24$ $6x + 2y = 10$</p>	<p>Students should respond: negative/positive slope change direction of the line. Y-intercept tells us where the line crosses the y-axis.</p>
30 minutes	<p>Pass out a handout titled: Exit Ticket/ Ticket de Salida for students to compete individually. If enough time review answers to the handout for student to self-assess how they think they did on the Exit Ticket.</p>	<p>Students will compete handout by answering each question as best they can as well as respond thoughtfully to each reflection question on the back of the exit ticket.</p>

(Participation Rubric)

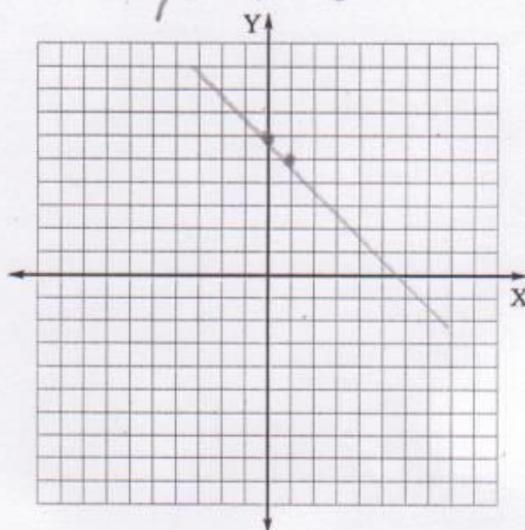
Participation	Active engagement (5 points possible)	Passive engagement (3 points possible)	No engagement (0 points possible)
Group discussions	<ul style="list-style-type: none"> -Actively and respectfully listens to peers -Comments are relevant and reflect an understanding of assigned material. -Actively participates at appropriate times. 	<ul style="list-style-type: none"> -Sometimes displays lack interest. -Comments are sometimes irrelevant and lack of attention to previous comments. -Sometimes participates but at other times is “tuned out.” 	<ul style="list-style-type: none"> -No interest -Comments are not relevant to the assigned material. -No participation.
Class discussions	<ul style="list-style-type: none"> -Actively and respectfully listens to peers and teacher. -Comments are relevant and reflect an understanding of assigned material. -Actively participates at appropriate times. 	<ul style="list-style-type: none"> -Sometimes displays lack interest. -Comments are sometimes irrelevant and lack of attention to previous comments. -Sometimes participates but at other times is “tuned out.” 	<ul style="list-style-type: none"> -No interest -Comments are not relevant to the assigned material. -No participation.

(Sample Problem Graphs)

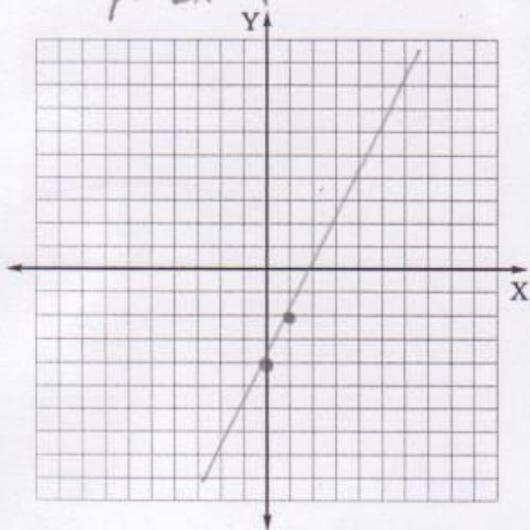
Sample 1
 $y = 4x + 2$



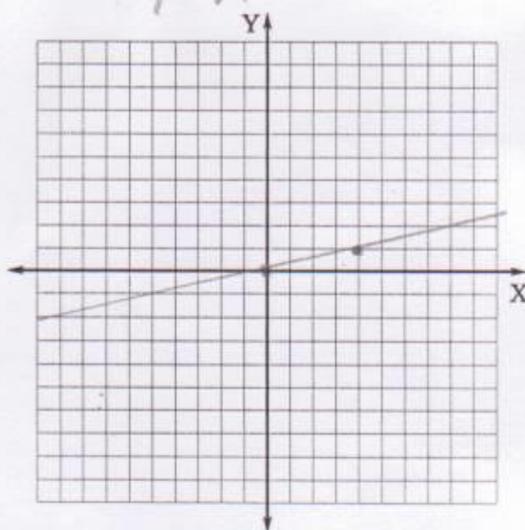
Sample 2
 $y = -x + 6$



Sample 3
 $y = 2x - 4$



Sample 4
 $y = \frac{1}{4}x$



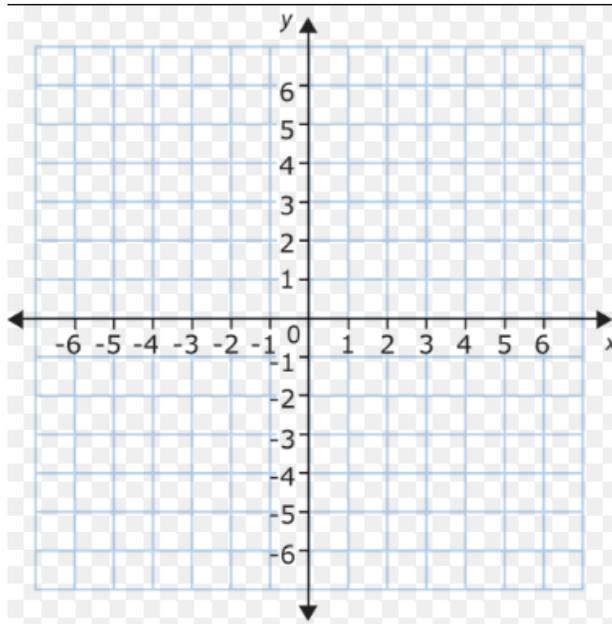
(Entry Task)

Entry Task (Primer Tarea)

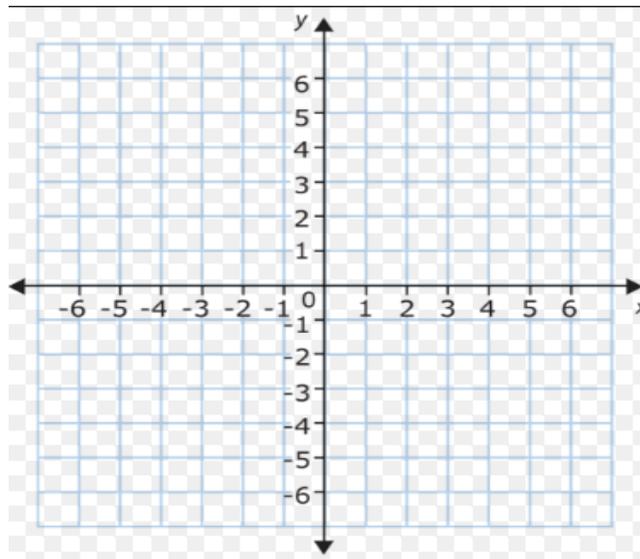
1. Solve for 'y'. (Resuelve por 'y')

$$-8x + 2y = 4$$

2. Make T-Chart and graph $-8x + 2y = 4$. (Hacer "T-Chart" y despues as un grafico)



3. Find x and y intercepts of $y = 2x - 2$ and graph. (Encuentra las intersecciones 'x' y 'y' despues as usando estos un grafico puntos)



(Exit Task)

Exit Ticket (Ticket de Salida)

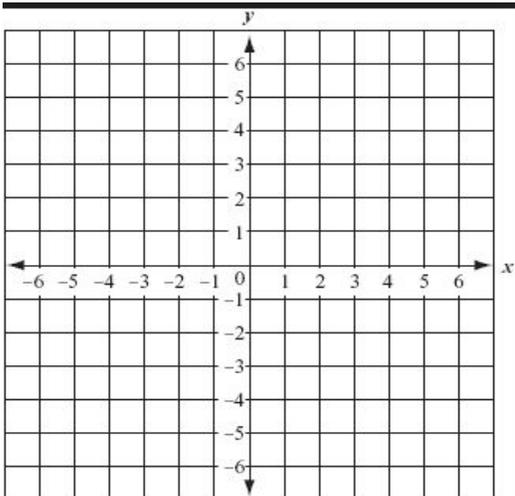
Label the slope and y-intercept of each equation. Then graph the line. Show your work!

(Identifica el pendiente y la interseccion 'y'. Despues as una grafica de la ecuacion). Demuestra tu trabajo!

1. $-5x + 4y = -16$

m = Slope: _____

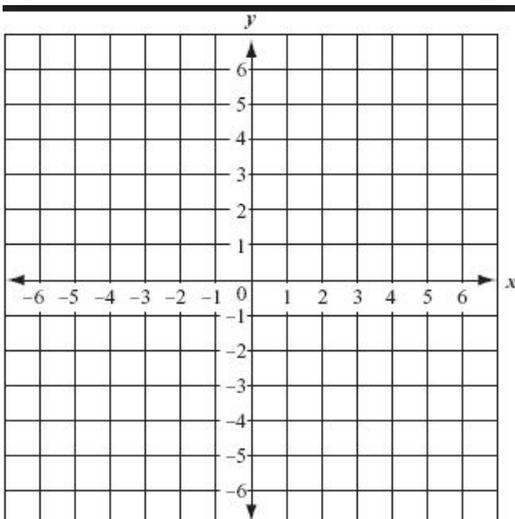
b = y-intercept: _____



2. $y = \frac{5}{2}x - 4$

m = Slope: _____

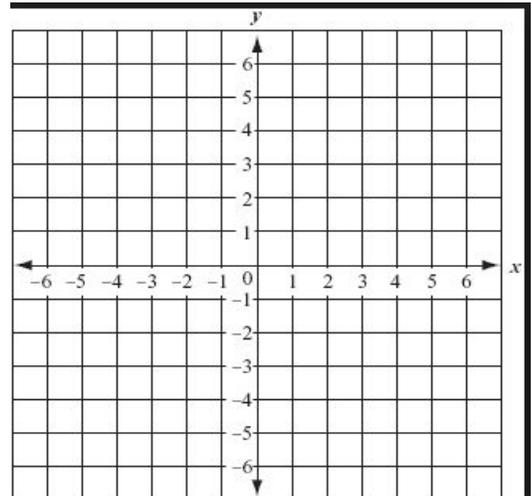
b = y-intercept: _____



3. $-3x + 2y = 6$

m = Slope: _____

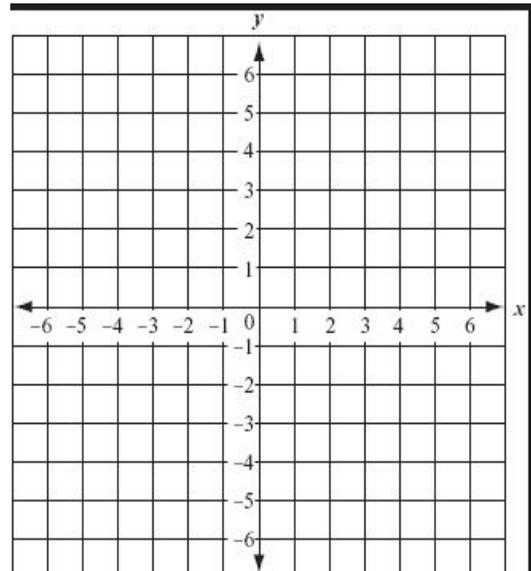
b = y-intercept: _____



4. $y = -\frac{3}{2}x + 3$

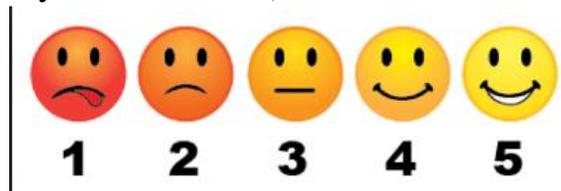
m = Slope: _____

b = y-intercept: _____



Reflection (Reflexion)

1. State the learning objective for this lesson.
(Indique el objetivo de aprendizaje de esta leccion).
2. On a scale of 1-5 circle your level of understanding on the lesson. 1= Not understanding much and 5= I know a lot
(En una escala de 1-5 marque su nivel de comprension en la leccion.
1 = No entiendo mucho y 5 = Se mucho)



3. Identify 2-3 places where you might go get more help on this lesson.
(Identifique 2-3 lugares donde pueda ir a obtener mas ayuda en esta leccion.)