

Lesson Plan Template Draft: Section 3.3: Intercepts

Teaching point / Objectives: <ul style="list-style-type: none">Identify InterceptsGraph a linear equation by finding and plotting interceptsIdentify and Graph Vertical and Horizontal Lines	Length of lesson: 50mins	Materials: Text: Beginning and Intermediate Algebra 6 th Edition-Elayne Martin Gay Active Learning Strategy Procedure I.D. Cards (for students to use as rulers) Graphing paper for teacher and students
Active learning strategies that this lesson employs: FISHBOWL: the purpose of this activity is to model classroom discussion and encourage more class participation. <ul style="list-style-type: none">Example 1 of how to implement fishbowl activity: https://www.youtube.com/watch?v=QEHANAmIFYQExample 2: https://www.youtube.com/watch?v=WDC3j9ghaYg <p>Step 1: Provide each student a slip with the real-world problem (see problem below in real-world connection section).</p> <p>Step 2: Give students 10mins to complete problem on their own.</p> <p>Step 3: Divide class into groups of 4-5.</p> <p>Step 4: Explain to students the directions for how we are going to conduct the fishbowl activity (see video of example above)</p> <p>Step 5: To ensure students are actively listening, give students outside of the fishbowl a task to complete.</p>		

Real-world connection / focus / word problem connecting lesson to real-world: (What is the connection between this content and a student's future study or or the "real world"? What is the context of this lesson? What problem will you use to hook students into the lesson to make a real-world connection to content that they are going to learn today?)

· For the YMCA's upcoming basketball tournament this summer tickets will go on sale tomorrow. Adult tickets will cost \$5.00 and student tickets will cost \$3.00. The YMCA wants to bring in \$1,200 for a basketball game to help cover cost and raise money to support the tournament. The equation that describes the ticket sales is $5x + 3y = 1,200$, where x represents the adult tickets and y represents the student tickets.

How are you using this context to introduce or reinforce the teaching point?

- By asking the following questions:
- 1) How many adult tickets need to be sold for the gym to make \$1,200 if no students attended the game? (Shhh, this will lead to our x-intercept, but do not tell students this yet, see procedure below)
 - 2) How many student tickets need to be sold for the gym to make \$1,200 if no adults attended the game? (Shhh, this will lead to our y-intercept, but do not tell students this yet, see procedure below)
 - 3) Looking at the equation $5x + 3y = 1,200$, what do you notice about the value of x (student tickets) when you determined your solution for number 1?
 - 4) Can I represent this scenario on a graph? If so, how?
 - 5) (more questions can be added here...)

Anticipated time	Stage and aim	Procedure

<p>15-20mins</p>	<p>Test- to assess students' prior knowledge, students so task with the target content. T monitors to see how well they do.</p>	<ul style="list-style-type: none"> ü Provide the real-world problem to each student ü Give students 7-10mins to work on this question independently ü Introduce to students what is the fishbowl activity, purpose, and answer any clarifying questions students may have ü Execute the steps above in "Active Learning Strategy" section for the fishbowl activity ü Actively circulate classroom as students as discussing solutions and jot down notes to help you teach lesson- using student input as a starting point
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<p>10-15mins</p>	<p>Teach- to review/cover content that is unclear. After observing Ss do task, T presents language that Ss had difficulty with or didn't know. This stage could be teacher fronted presentation or student centered.</p>	<ul style="list-style-type: none"> v Gather students together, compliment them on their hard work coming up with solutions on their own and discussing it with the class v Begin lesson with..."So during the discussion I heard 'Student Name' say her solution to #1 was '240 adult tickets must be sold to make a profit of 1200 because she solved for x when y=0.' v <i>Follow-up question leading to lesson:</i> Why do you think she set y=0? v <i>Possible answer:</i> "Because the problem stated that no student tickets were sold and the y variable represents the student tickets, so if no student tickets were sold then y=0. Then you will have to figure out 5 times what quantity will give us 1200. & that is how she got 240 because 5 times 240 will give you 1200. And since x represents the adult tickets then you will have to sell 240 adult tickets in order to make the desired profit." v Teacher: So let's take it out of context for a second. What if I had the following equation: $x-3y=6$ and I told you to determine the x-value of this equation when $y=0$. How will you calculate this value? v Students: begin to use the same method used by the student v Teacher: circulates to see what students are doing, and goes to the board and states "I saw Student B doing _____ and he got $x=6$. Anyone agree or disagree with this solution?" v <i>Teacher introduced the mathematical terminology by saying/ asking the following:</i> "Does anyone know what we call this? When you set $y=0$ and solve for x in a given a equation? What are we finding?" v Student/Teacher: That is called the x-intercept. (Go through similar questioning for the y-intercept) v Student: Writs this new vocabulary down in their notebooks v So what if I was given the following graph below. Can you describe to me where is the line touching the x-axis? Where is it touching the y-axis? What do we call that point where it is touching the x-axis? What do we call that point where it touches the y-axis? v v What if I was given only an equation, such as the following. How can I determine the x-intercept? Y-intercept? How can I then graph these intercepts? v
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10-15mins	Test- to assess what students have understood. Ss then do a second activity with math vocabulary. After the presentation from T they should now do task better than the first time in stage 1.	Going back to our opening activity that we discussed for the fishbowl, students should graph the x- and the y-intercept in the YMCA problem. Students should then be directed to connect the points to create a straight line (linear equation).
5-10mins	Practice Activities- To provide students with practice and to generate an opportunity for more questions	Graph each linear equation by finding and plotting its intercepts.

Anticipated problems and potential solutions in this lesson (These can be either problems with logistics / timing, or problems to anticipate with students' knowledge / grasp of the content. Where will students have difficulties? What would you want a newer teacher to anticipate?)

Ø Students may encounter difficulty determining the x- and y-intercept if an equation not written in standard form Ex: $4x = 3y - 9$, however, it is important to let them know the same procedure can be used find the x- and y-intercept and then they can graph the equation using the intercepts.

Differentiation: In what places in the lesson are you differentiating for students in different ability groups?

- The fishbowl activity engages all types of learners- auditory, visual, and kinesthetic.
- During the “teach” component of lesson, I will be asking varied questions for learners at different levels. Giving everyone an opportunity to access this lesson no matter their background knowledge
- Practice activity will also have questions for learners who are still grappling with the content and more challenging questions for learners who are ready to take on the more challenging questions related to the content

Where are these on your lesson plan?

- My lesson begins with an activity that requires students to take the time to internalize a problem and solve this problem at their own pace- this aids my independent learners
- Fishbowl activity
- Teach, Test, and Practice activities component of lesson

Ideas for extensions, notes, considerations, or alternative plans:

∅ It is important to keep in mind that in the test-teach-test approach to this lesson, the professor monitors and listens to the students to see where they are struggling during the opening activity. You will then use this as a teaching point to introduce new vocabulary such as – x-intercept, y-intercept, vertical line, and horizontal line.

∅ Test-teach-test is similar to present, practice, produce, but it's a bit more active because the lesson begins by figuring out what students know and what needs to be explained. As a result, present the problem in a clear, easy-to-read format, and answer any clarifying questions if necessary before students begin to answer the problems associated with the problem.

∅ The benefit of this approach is that it allows students to become immediately active and involved in the beginning of the lesson

∅ Feel free to include additional problems from the textbook where you feel fit and/or questions from My Math Lab