DAY 3

WRITE THE EQUATION OF A LINE PARALLEL TO A GIVEN LINE

Performance Objectives:

- Given the equation of a line in slope-intercept, standard, or point-slope form, students will be able to recognize and/or solve for the slope of the line and recall that parallel lines have equal slopes 4 out of 5 times.
- Given a point that lies on the line and the slope of the line, students will be able to substitute the values appropriately into slope-intercept form and solve the resulting equation for the y-intercept 4 out of 5 times.
- Given the slope and the y-intercept, students will be able to substitute the values into slope-intercept form of the equation of a line 5 out of 5 times.

Resources or Materials Needed:

Materials:

- ✓ Answers for the homework due today: *Homework-Day 2* (See Appendix N)
- ✓ PowerPoint about writing an equation of a line parallel to another line (given in various forms): *Presentation-Day 3* (See Appendix O)
- ✓ Copies of tonight's homework assignment: *Homework-Day 3* (See Appendix P)

Resources:

- ✓ Projector
- ✓ Computer with access to Microsoft Office: PowerPoint
- ✓ Whiteboard with markers and eraser
- ✓ Wi-Fi

- ✓ Each student will need an internet enabled device to use the Desmos Scientific Calculator. Link: https://www.desmos.com/scientific

Time: 45 minutes.

Step 1: Pre-Instructional Activities: Students will complete a couple of review problems and then there will be one problem as a preview of today's lesson.

Step 2: Content Presentation: Students take notes while teacher presents the PowerPoint which includes both the step-by-step procedure how to write the equation of a line (in slope-intercept form) parallel to another line (given in various forms) and examples in the pattern of "I do, We do, You do."

The steps are as follows:

1) Get slope. Parallel Lines have equal slopes (same number).

    a. If the line given is in slope-intercept form or point slope form, identify the slope from the equation.

    b. If line given is in standard form, convert it to slope-intercept form and identify the slope.

2) Find the y-intercept. Now that you have the slope of the new line, you need to calculate the exact y-intercept that fits within the specific parameters given.

    a. If you are given a point that the parallel line passes through, substitute the ordered pair and the slope in to the appropriate places in slope-intercept form and solve for "b" (the y-intercept).

b. If you are given another line and are told that the new line has the same y-intercept as it then:

i. If in slope-intercept form, simply identify the y-intercept.

ii. If in point-slope or standard form, convert to slope-intercept form and then identify the y-intercept.

3) Write the equation of your parallel line in slope-intercept form, making sure you are using the slope and y-intercept that you found during these steps.

Now it's time to see these steps in action by working through examples in the presentation together. While the teacher is solving the examples "I do" examples, the teacher should show the students the online scientific calculator from Desmos, which can be found at www.desmos.com/scientific. (Inc., 2018) The teacher should also explain that this is a tool that can be used during class but isn't always necessary to use and that on a quiz/test the students will be given a calculator to prevent suspicion of cheating. Most students will be using the Desmos Scientific Calculator on their cell phones, so on a quiz or test they will be typing numbers into their calculator, but that also looks like they could be texting someone for help or asking the internet. There are a variety of types problems students may encounter. As the teacher continues, gauge how the students are doing. If they seem to be understanding, allow them to work through the examples (one at a time) independently, compare their answer with a neighbor, and make any corrections necessary before the teacher models the correct answer on the board (including all supporting work in an organized fashion.)

Worked out answers to problems in the PowerPoint Presentation:

Do Now

1. $(-9,3)$ *and* $(0,0)$

$$m=\frac{0-3}{0-(-9)}=\frac{-3}{0+9}=\frac{-3}{9}=-\frac{1}{3}$$

$$3=-\frac{1}{3}(-9)+b$$

$$3=3+b$$

$$-3 \quad -3$$

$$0=b$$

$$y=-\frac{1}{3}x+0$$

$$y=-\frac{1}{3}x$$

2. *Through* $(-4, 10)$ *parallel to* $y=2x-4$

$$\| \; m=2$$

$$10=2(-4)+b$$

$$10=-8+b$$

$$+8 \quad +8$$

$$18=b$$

$$y=2x+18$$

Examples:

1. $$\| \; m=\frac{7}{5}$$

$$2=\frac{7}{5}(5)+b$$

$$2=\frac{35}{5}+b$$

$$2=7+b$$

$$-7 \quad -7$$

$$-5=b$$

$$y=\frac{7}{5}x-5$$

2. $$\| \; m=\frac{9}{2}$$

$$4=\frac{9}{2}(3)+b$$

$$4=\frac{27}{2}+b$$

$$-\frac{27}{2} \quad -\frac{27}{2}$$

$$\frac{8}{2}-\frac{27}{2}=b$$

$$-\frac{19}{2}=b$$

$$y=\frac{9}{2}x-\frac{19}{2}$$

3. $$\| \; m=-\frac{3}{4}$$

$$-1=-\frac{3}{4}(1)+b$$

$$-1=-\frac{3}{4}+b$$

$$+\frac{3}{4} \quad +\frac{3}{4}$$

$$-\frac{4}{4}+\frac{3}{4}=b$$

$$-\frac{1}{4}=b$$

$$y=-\frac{3}{4}x-\frac{1}{4}$$

4. $$\| \; m=-\frac{5}{3}$$

$$3=-\frac{5}{3}(2)+b$$

$$3=-\frac{10}{3}+b$$

$$+\frac{10}{3} \quad +\frac{10}{3}$$

$$\frac{9}{3}+\frac{10}{3}=b$$

$$\frac{19}{3}=b$$

$$y=-\frac{5}{3}x+\frac{19}{3}$$

Step 3: Learner Participation: Learners will take notes and then complete examples throughout the presentation. During the middle examples “we do” (if instructor deems appropriate), the students may work on the problems (one at a time) and compare answers with a neighbor. The last few examples, learners may volunteer to write their answers on the board.

Step 4: Assessment: Also, review problems at beginning of class, working examples during the main presentation of content, and tonight’s independent practice (homework assignment). In addition to questions about this content on summative assessments.

Step 5: Follow-Through Activities: The next two classes will focus on practicing these skills in either whole class practice, independent practice, partner practice, or stations. In addition to including these types of problems as future “Do-Nows” so learners continue to practice.