<u>Linear Equations Class Work (Parallel & Perpendicular Lines)</u>
✍ **Objective:** You will be able to write equations for parallel and perpendicular lines.

-Write-Pair-Share:

☆ *What do you remember about the slopes of <u>parallel</u> lines?*

Can you provide an example?!?

☆ *What do you remember about the slopes of <u>perpendicular</u> lines?*

Can you provide an example?!?

✎ *Guided Example: Writing Equations for Parallel & Perpendicular Lines*

A. Write the equation of the line parallel to $4x + 5 = 2y$ that passes through the point $(8,-2)$.

B. Write the equation of the line perpendicular to $-4x + 3y = 1$ that passes through the point $(3,1)$.
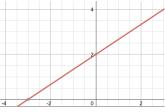
✎ *Now You Try Some!*

1. Write the equation of the line perpendicular to $2x - 3y = 8$ that passes through $(-5,3)$.

2. Write the equation of the line parallel to $6x - 6y = 8$ that passes through $(-2,4)$.

3. Write the equation of the line parallel to $-2y = 8x + 12$ that passes through $(3,-3)$.

4. Write the equation of the line perpendicular to $8x + 2y = 16$ that passes through $(-20,18)$.

5. Write the equation of the line parallel to $2x + 8y = 14$ that passes through $(-3,6)$.

6. Write the equation of the line perpendicular to $-4x + 3y = 12$ that passes through $(12,-15)$.

☆ **1: Describe the process involved with writing equations for parallel lines.**

☆ **2: Describe the process involved with writing equations for perpendicular lines.**

Linear Equations Class Work (Parallel & Perpendicular Lines Continued)

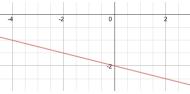✎ *Guided Example: Determining a Missing Value*

Line B is parallel to the pictured line and passes through the points (-3,y) and (2,4).

Line C is perpendicular to the pictured line and passes through the points (x,x+1) and (-3,0)
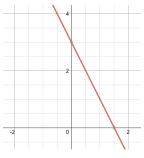
Determine the values of x and y.

✏ *Now You Try Some!*

1. Line M is parallel to the pictured line and passes through the points (13,18) and (x,-4).

Line N is perpendicular to the pictured line and passes through the points (0.5,5) and (y-3,y).

Determine the values of x and y.

2. Line J is perpendicular to the pictured line and passes through the points (y+4,y) and (4,1).

Line K is parallel to the pictured line and passes through the points (1,-1) and (x,-4).

Determine the values of x and y.

3. Line F is given by the equation $4x - 8y = 20$. Line G is parallel to line F and passes through the points $(x,15)$ and $(3,-3)$. Line H is perpendicular to line F and passes through the points $(-4,3)$ and $(y,y-24.5)$. Determine the values of x and y.

Mixed Review: Show all work on a separate sheet of paper.

Robert is designing an outline for a house that is to be built on a plot of land, using the coordinate grid as a guideline. The house will be a quadrilateral with vertices at H(-5,1), U(-2,5), E(3,-5), and S(6,-1). Each unit on the grid represents 1 yard.

Part A: Represent the outline of the house on graph paper.

Part B: Show that the house will actually be in the shape of a parallelogram, by showing that the opposite sides of the house are parallel. Use the relationship between slope and parallel lines, and show all calculations.

Part C: The house will actually be a rectangle! Show that the measure of the angle formed by sides $\overline{HU}$ & $\overline{US}$ is 90 degrees. Explain using the relationship between slope and lines that form a 90-degree angle. You may reference calculations from Part A as necessary.

Part D: Robert would like to also plan to create a fence around the house. On side $\overline{UH}$ of the house, the fence will be parallel to the side of the house, and pass through the point (-8,3). Write the equation for the line that represents this piece of the fence in slope-intercept form. Show all work. Represent non-whole numbers as fractions. You may reference calculations from Part A as necessary.

Part E: Write the equation for the line that represents side $\overline{US}$ of the house in slope-intercept form. Show all work. You may reference calculations from Part A as necessary.

Part F: One side of the driveway of the house will be perpendicular to the front of the house, side HE, and will pass through the point (-2,-3). Write the equation for the line that will represent this side of the driveway.

Part G: One corner of a pool will be placed at a point (x, x+1) in the back yard. The line that this point lies on is perpendicular to side $\overline{US}$ of the house and also passes through the point (15,19). Determine the coordinates of this corner of the pool (that is, x and x + 1).

Part H: The family purchasing the house will place a $60,000 down payment on the house, and then pay the rest off by paying a consistent amount monthly. After five months, the family will have paid a total of $77,500, and after a year, the family will have paid a total of $102,000. Determine the amount the family will pay per month.