Summer Assignment 2009 for Algebra II Pre-AP Students: Linear Design Project

Welcome to the continuation of Algebra I. Algebra II can be briefly described as the survey of functions. In Algebra I, you primarily learned about linear and quadratic functions. In Algebra II, we will go even deeper into these topics and learn about other functions such as exponential, logarithmic, rational, and irrational functions.

To help me get to know you and to review your linear functions skills, the **task before you is to design a picture, using linear equations, that symbolizes either how you feel about math or defines what you think math is all about.** For example, I would make a picture of a cell phone because I think a cell phone symbolizes communication. One of the major skills math helps students develop is how to communicate specific ideas and concepts clearly. In fact, learning how to communicate mathematically is almost like learning another language since mathematics has its own notation and accepted procedures.

Part I: Linear Equations

A. Draw your x and y-axis on a sheet of graph paper, creating four congruent quadrants. Create your linear design that address one of the two prompts given above. Make sure your design takes up most of the paper. You are welcome to use more than 15 lines in your design, but you only need to include 15 linear equations in the list you are giving below.

B. Write linear equations for 15 of the lines in your design. Give all equations in slope-intercept form (y=mx+b). See the review notes on the back of the Equation List if you need some help writing your equations or e-mail me at lramir1@neisd.net . Feel free to crop the extra white space of the Equation List sheet when you mount it on your poster .

C. Label your design with the line numbers that correspond to the list of equations you wrote.

Part II: Presentation of Design

Color your design. As long as you have your 15 lines, you may include other objects to enhance your design (such as circles, stars, etc.)

Part III: Design Rationale

Type a short rationale for how your design illustrates how you feel about math or describes what math is all about. Please be as authentic and as specific as possible.

Part IV: Math Autobiography

Type an autobiography in regards to your math learning up to this point. In writing your narrative, consider these questions: Where did you go to school? What mathematical topics did you enjoy learning? Which math topics were challenging for you to master? What math topics came easy to you? Define what success looks like for you in the math classroom. What have your previous math teachers done that have really helped you be a successful math student? What suggestions do you have for me this year that will help me support you in being as successful a math student as possible? Are there any math topics that you are curious about and would like to learn more about?

Part V: Putting It All Together

On half of a standardized sheet of poster board, mount your design, rationale, and list of linear equations on the front. Put a creative title on your design. On the back, mount your math autobiography and make sure your name is clearly visible.

Bring your project to class on the first day of school so you can share it with us. Feel free to drop it off in the morning if you do not want to carry it around all day. It will be graded by the rubric given below. (If it is late, five points will be deducted for every school day.)

Summer Assignment Rubric: Linear Design Project

Part I: Linear Equations (45 points maximum)

Each linear equation is worth 3 points; 2 points for having the correct slope and 1 point for having the correct y-intercept.

Part II-V will be assessed using the following rubric.

	Excellent 100%	**Proficient (85%)**	**Adequate (70%)**	**Needs Improvement (60%)**	**No credit**
Design Presentation (15 points)	Wow! You have obviously put considerable effort into your design. It is original, creative, colorful, and very precisely drawn.	Your design looks carefully detailed, original, and colorful.	Your design does not have a sense of completeness. It is not show much effort was taken to make it.	The design was made without effort and does not apply to the prompt given.	No design was included with the project.
Design Rationale (15 points)	The typed rationale directly explains how the design relates to how the student feels about math or how the student would describe what math is all about. There are no grammatical errors.	The typed rationale is vague, OR there are several grammatical errors.	The typed rational vaguely addresses one of the prompts, AND there are several grammatical errors.	The typed rationale does not address any of the prompts.	The design rationale is missing.
Math Autobiography (15 points)	The typed rationale thoroughly addresses most of the questions about the student's experience as a math learner. The narrative is coherent and has no grammatical errors.	The typed rationale is not as specific or thorough in addressing the questions provided. There may be a few grammatical errors.	The typed rationale only addresses one or two of the provided questions. There may be several grammatical errors.	The typed rational vaguely addresses any of the questions and has many grammatical errors.	The math autobiography is missing.
Project Presentation (10 points)	The list of equations, linear design, and typed rationale are all: (1) neatly arranged, (2) on the front of the $\frac{1}{2}$ sheet of poster board, and (3) with a title. The typed math autobiography is (4) mounted on the back.	One of the four stated in the "Excellent" category is missing.	Two of the four stated in the "Excellent" category are missing.	Three of the four stated in the "Excellent" category are missing.	All four of the four stated in the "Excellent" category are missing.

Linear Equation Review

In y=*m*x + *b*, *m* represents the slope and *b* represents the y-intercept. You can find the slope of line by counting the $\frac{\text{rise}}{\text{run}}$ from one point to another point on the linear graph. It is better to leave slope as a simplified improper fraction. You can also find the slope when you have two points by using the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$.

If you are having trouble calculating the y-intercept, you can use the point-slope formula. Use a point from the line (x_1, y_1) and the slope, m, to plug values into $y - y_1 = m(x - x_1)$. Once you plug in the three numbers, you get y by itself (to have a y=mx + b equation).

If you are writing an equation for a vertical line, do not use y=mx + b. Vertical lines are not linear functions but are linear relations. Use x=#; the # represents the number on the x-axis where the vertical line will cross if it were extended far enough.

Linear Design Project – Equation List

Line #1:

Line #2:

Line #3:

Line #4:

Line #5:

Line #6:

Line #7:

Line #8:

Line #9:

Line #10:

Line #11:

Line #12:

Line #13:

Line #14:

Line #15:

Don't forget to label your lines on the design by writing the line number next to each line segment in your picture!