

**Project Definition:**

Use function transformations to create a picture or design using: Mathematica©

**Requirements Check List:**

- Create 1 picture using functions plotted on a single axis
- Use at least 3 different types of functions
- Perform several transformations demonstrating each of the following at least once:
  1. Vertical Shift Up
  2. Vertical Shift Down
  3. Horizontal Shift Right
  4. Horizontal Shift Left
  5. Vertical Stretch
  6. Vertical Compress
  7. Horizontal Stretch
  8. Horizontal Compress
  9. Vertical Reflection
  10. Horizontal Reflection

You may use combinations, but each transformation must be done using function notation. For example,  $g(x) = \sqrt{4-x^2}$  does not show a transformation. Using  $g(x) = 2f(x/2)$  where  $f(x) = \sqrt{1-x^2}$  does.

- Identify which of your functions (by function name as it appears in your file) meet the project requirements
- Include a description of the transformed function's appearance in your picture

f0	1 Semi-circle	<input checked="" type="checkbox"/>
Bdy	2 line	<input checked="" type="checkbox"/>
Piece-Wise	3 Piece-Wise	Piece-wise lines to get line segments <input checked="" type="checkbox"/> Piecewise is not it's own function type. It uses Bdy so it is just another line. You do not have a 3 <sup>rd</sup> function type. (-1)
Your Function Name	Transformation	Descriptions
Eye left	1	<input checked="" type="checkbox"/>
Mouth	2	<input checked="" type="checkbox"/>
Eye right	3	<input checked="" type="checkbox"/>
Eye left	4	<input checked="" type="checkbox"/>
Head upper	5	<input checked="" type="checkbox"/>
f0	6	0.5f0[2x], Black Nose <input checked="" type="checkbox"/>
Head upper	7	<input checked="" type="checkbox"/>
Nose <input checked="" type="checkbox"/> should be f0	8	This is a horizontal compress, but "Nose" is not one of your named functions. (- 1/2 ) You did the compress on the function named f0, in fact you used it correctly in #6 above.
mouth	9	<input checked="" type="checkbox"/>
Eye left <input checked="" type="checkbox"/> should be f0	10	The "eye" could have been a horizontal reflect, but you wrote it as a shift left instead. You do have 3 horizontal reflects of f0 to make the hair, but you did not identify one. (- 1/2 )
f0	1 Semi-circle	<input checked="" type="checkbox"/>

- Submit this page (in class) and your Mathematica© notebook (by e-mail to [DanaL@Harker.org](mailto:DanaL@Harker.org)) on Thursday Sep 14:
  - Projects submitted after the due date receive a 1/2 point deduction per class day late.
  - There is a 1 point "early submission bonus" for projects submitted on or before Monday September 11.
  - Projects resubmitted with corrections are graded as of their last resubmit (includes late penalties calculated as of last submit date).

**Grading Rubric out of 15 Points (this section is for teacher use only):**

- Total: 13
- 3 Function Types: 2
  - 10 Transformations: 9.5
  - 2 Presentation: 1.5
  - Early/Late: 0

