Geometry: Domain and Range?

- Domain: \(-4 \leq x \leq 4\) (x-intercepts)
- Range: \(0 \leq y \leq 8\) (y-intercepts)
Part B: Make An Isosceles Triangle Congruent To The Last One That Has The Segment Connecting (0,0) to (8,0) as its base.

- What are the equations of the lines?
- How do they compare to the lines in the previous problem?
- What is going on with the slopes and y-intercepts?
Partner 1: What equations will form a rhombus for Part A?
Partner 2: What equations will form a rhombus for Part B?

Rules: One Elbow Partner Does It For Part A and One Does It For Part B

• How are those equations related to the original ones?
• What transformations are happening?
• Turn to your partner(s), compare and contrast your results.
• What would happen for a rhombus made from the equations:
  \[ y = (-1/2)x + 4 \] and \[ y = (1/2)x + 4 \] (all can do together)
Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
Given The Base AB Of An Equilateral Triangle With A(-1,0) And B(0,1)

- What is the height of the triangle?
- What are the equations of the lines that make an equilateral triangle?
- What is the vertex?
- What is going on with the slopes and y-intercepts?
Questions for Both Partners

• What shape is it? How do you know?
• What is its perimeter? area?
• How do the two graphs compare?
• What about $y = 4$, $y = -4$, $x = 4$ and $x = -4$
Extend: What are the equations of those circles?
• What Equations Make an Equilateral Triangle With Base AB at A(0,0) and B(1,0)? Draw The Triangle.
• What is The Vertex of That Triangle?
• On The Same Graph, Sketch The Lines Below to Form a Rhombus:
  \[ y = x\sqrt{3} + \sqrt{3} \]
  \[ y = -x\sqrt{3} + \sqrt{3} \]
  \[ y = x\sqrt{3} - \sqrt{3} \]
  \[ y = -x\sqrt{3} - \sqrt{3} \]
• Label The Midpoints of The Sides of The Rhombus.
• Do You See The Hexagon?
Another Way To Ask…

• What Equations Make An Equilateral Triangle With Base AB at A(0,0) and B(1,0)? Draw The Triangle.
• Reflect This Triangle Across Both The X And Y Axes.
• Reflect One of Those Triangles Into Quadrant 3.
• Do You See A Hexagon?
• Which Equations Form The Regular Hexagon?
• What Are Its Vertices?