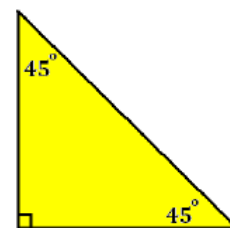# Right Triangles and Trigonometry: Construction of the Unit Circle
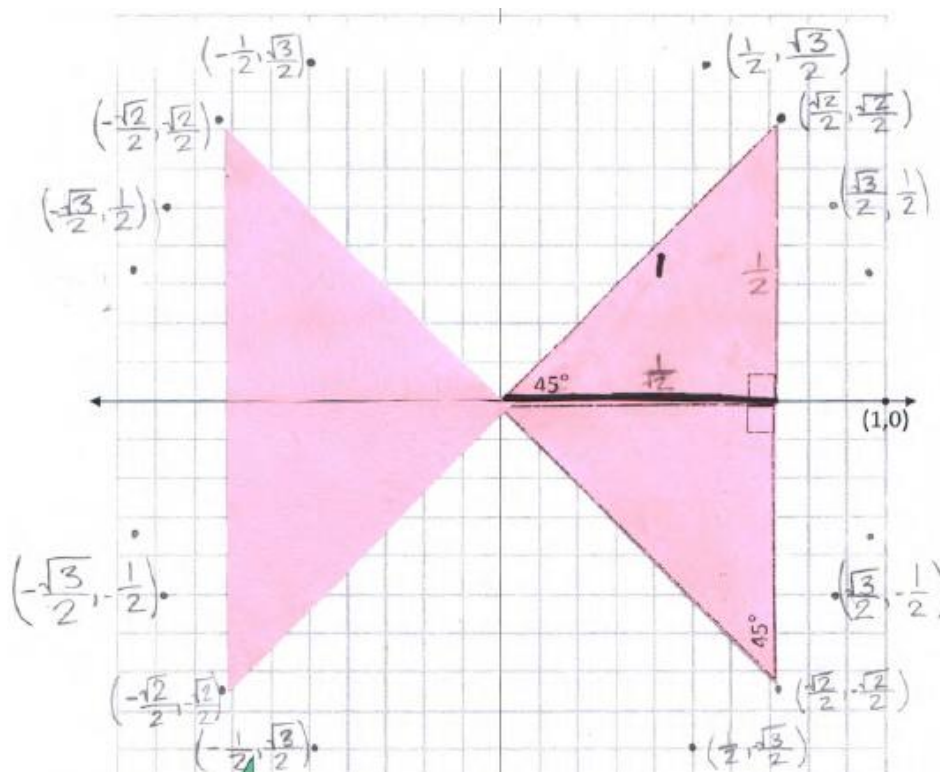
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Digital Copy-Ready Materials: http://nctm.leiboldmath.com

NCTM Regional Conference - Minneapolis

Thursday, November 12th, 2015 - 1:30 p.m. to 2:45 p.m.
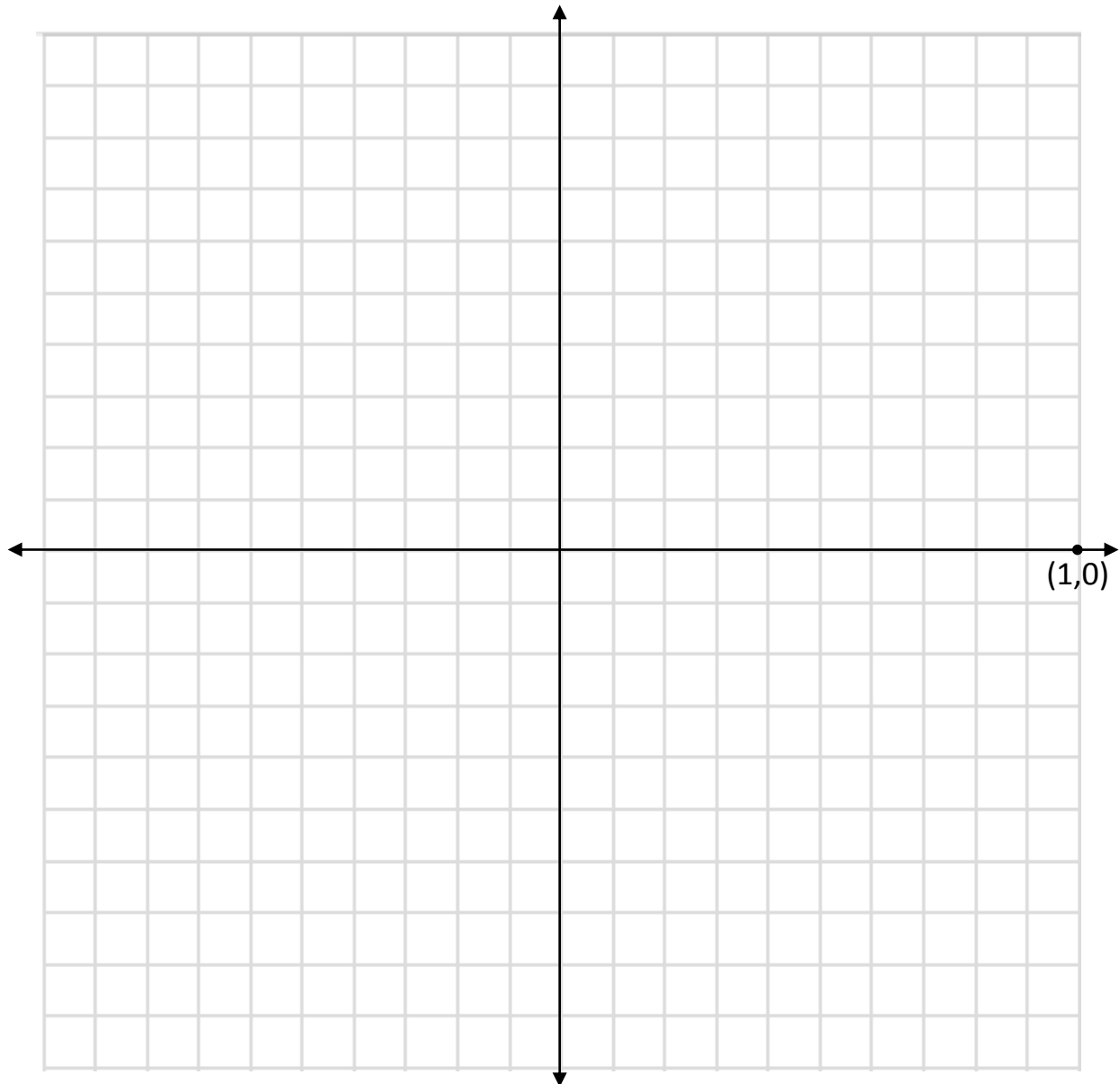
Minneapolis Convention Center, Room 200 GF

Name _____   Date _____

Trigonometric Exploration!

Use your triangles to plot points on the coordinate plane below.

1) Place the labeled angle at the origin and the darkened base along the x-axis.
2) Plot the point at the vertex of the other acute angle.
3) Label the coordinates of the point.

(1,0)

<u>After</u> you have plotted your points:

- Glue <u>four copies of one of the triangles</u> in each of the four quadrants (again, making sure the labeled angle is at the origin and the darkened base is along the x-axis). Then, glue your other three triangles here!

Name _____   Date _____

Important Questions

1) What seems to be true about all the points that you plotted?

   _____

   _____

2) How could you find more points that fit the pattern you described above?

   _____

   _____

3) Why should the points $(1,0), (0,1), (-1,0),$ and $(0,-1)$ be included?
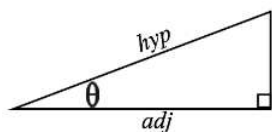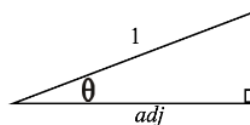
   _____

   _____

4) How do you find the length of *adj*…

   a) in terms of θ and *hyp?*   b) what if *hyp* = 1?

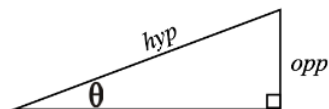
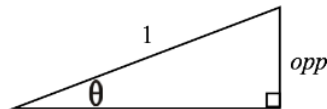5) How do you find the length of *opp*…

   a) in terms of θ and *hyp?*   b) what if *hyp* = 1?

6) Looking at the triangles you glued on the graph, which coordinate is the *adjacent* side? which is the *opposite* side?

   adjacent --> _____   *opposite* -->_____

   Combining your work from questions 4b), 5b), and 6), write the ordered pair for the yellow triangle in the first quadrant (like you did for all of the other triangles).

7) So, in the unit circle,

   $\cos \theta =$ _____ $\sin \theta =$ _____

8) What is the equation of your circle? (Hint: Pythagorean Theorem?)

Noticings and Wonderings #1 - Unit Circle Construction

What are some things you noticed about this activity?

_____

_____

_____

_____

_____

Think about your students - how would this activity go for them? What might be some of their challenges or misconceptions?

_____

_____

_____

_____

_____

What lingering questions do you have?

_____

_____

_____

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_____

Noticings and Wonderings #2 - Radian Exploration

What are some things you noticed about this activity?

_____

_____

_____

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_____

Think about your students - how would this activity go for them? What might be some of their challenges or misconceptions?

_____

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What lingering questions do you have?

_____

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Exit Ticket   **Name/Contact Info (optional)**_____

1) Did you come up with any neat ideas during the session? If so, we'd love to hear from you!

_____
_____
_____
_____

2) What revisions would you suggest to either portion of the lesson?

_____
_____
_____
_____

Exit Ticket   **Name/Contact Info (optional)**_____

1) Did you come up with any neat ideas during the session? If so, we'd love to hear from you!

_____
_____
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2) What revisions would you suggest to either portion of the lesson?

_____
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Exit Ticket   **Name/Contact Info (optional)**_____

1) Did you come up with any neat ideas during the session? If so, we'd love to hear from you!

_____
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2) What revisions would you suggest to either portion of the lesson?

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