

M205: Trigonometric Functions Post-Badge Task

Reflecting on Badge Learning

Now that you have learned more about trigonometric functions, respond to the questions that follow. These are the same questions you responded to before the start of this badge.

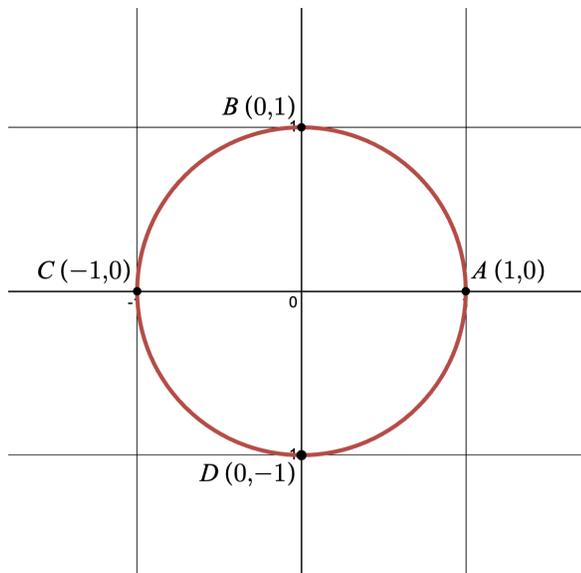
The Task

QUESTION 1

The image shows the unit circle with four marked points A , B , C , and D . Determine the standard position radian measure for each point.



Point	Radian Measure
A	0 or 2π
B	$\frac{\pi}{2}$
C	π
D	$\frac{3\pi}{2}$



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QUESTION 2

The figure shows concentric circles with radii 1 and 2, respectively. A mark is drawn at standard position angle 1 radian on the inner circle. Mark measurements of 1 radian and 2 radians on the outer circle.



Answers will vary. Possible student response: I looked up the definition of radian and learned a radian is "an angle at the center of a circle whose arc is equal in length to the radius." So, I used the ratio of angle measure: circumference:

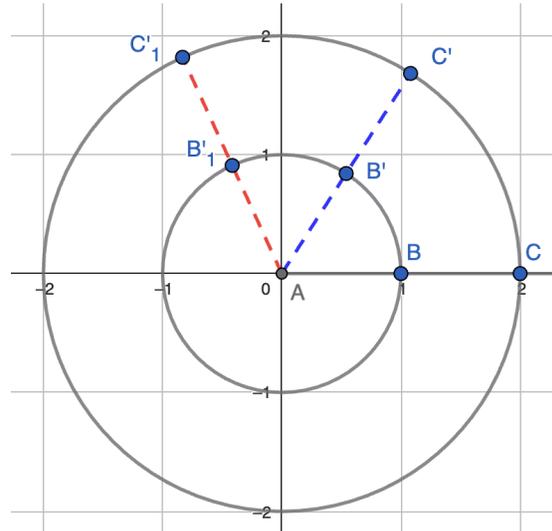
$$\frac{\pi}{180} = \frac{1 \text{ rad}}{x \text{ degrees}}$$

$$x\pi = 180$$

$$x = 180/\pi$$

$$x \approx 57.29 \text{ degrees}$$

Then I used Desmos-Geometry



(<https://www.desmos.com/geometry/ua7tmod1ox>) to create a segment that I could rotate 57.29 degrees at a time until I got both, the 1 radian angle (blue dotted lines) and the 2 radian angle (red dotted line).

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QUESTION 3

Evaluate each trigonometric expression.



$$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\cos \frac{2\pi}{3} = -\frac{1}{2}$$

$$\sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \frac{2\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\tan \frac{\pi}{4} = 1$$

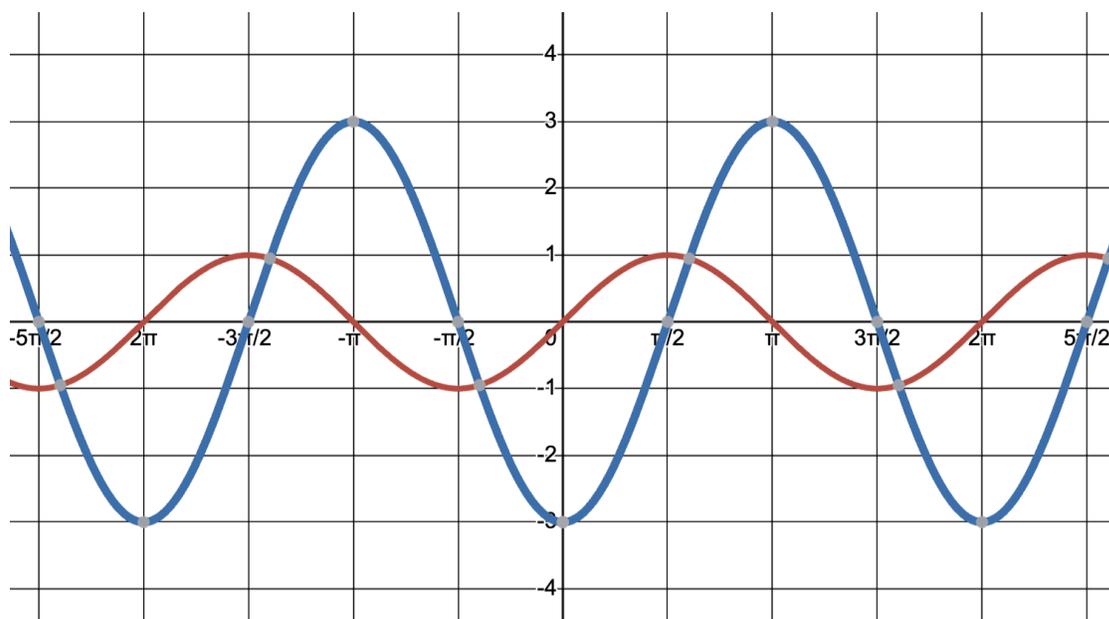
$$\tan \frac{2\pi}{3} = -\sqrt{3}$$

$$\left(\cos \frac{\pi}{4}\right)^2 + \left(\sin \frac{\pi}{4}\right)^2 = 1$$

$$\left(\cos \frac{2\pi}{3}\right)^2 + \left(\sin \frac{2\pi}{3}\right)^2 = 1$$

QUESTION 4

The image below shows the graph of $y = \sin x$. On the same grid, draw the graph of $y = 3\sin\left(x - \frac{\pi}{2}\right)$.



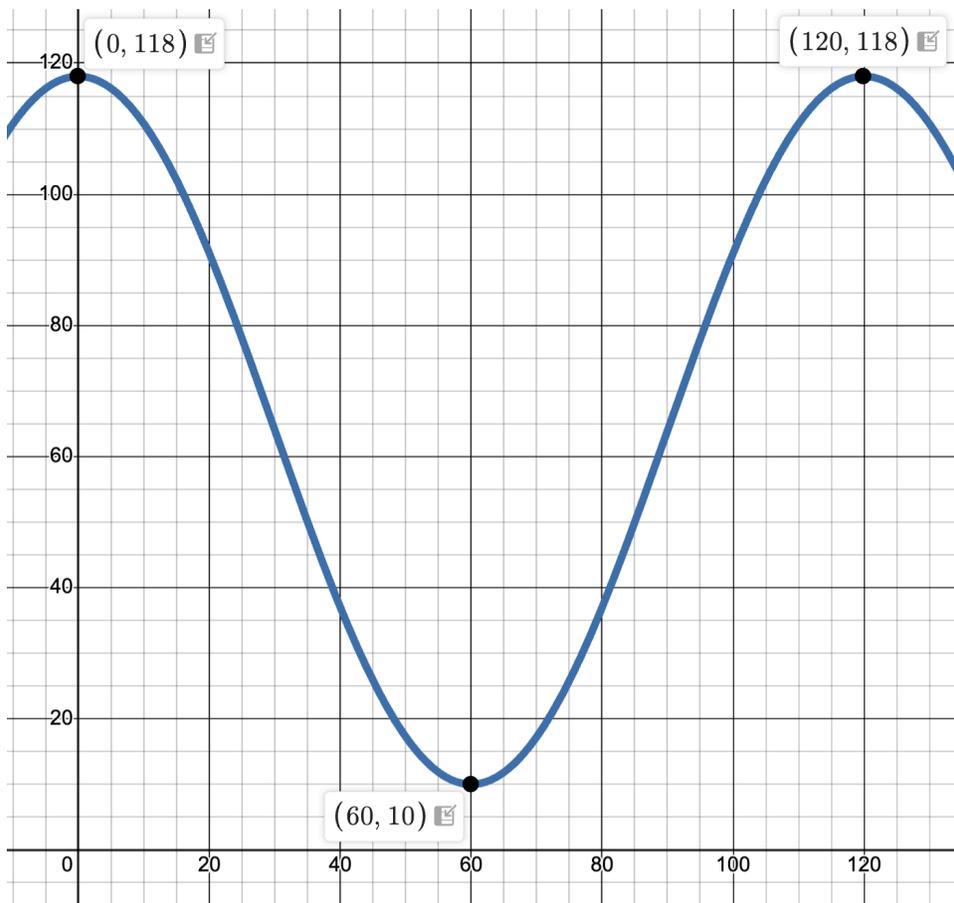
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QUESTION 5

The height h (measured in feet from the ground) of a rider on a Ferris wheel in Southern California can be modeled by the equation $h(t) = 64 + 54 \cos\frac{\pi}{60}t$, where t is measured in seconds. How long does it take for the Ferris wheel to complete one revolution? What is the maximum height reached by a rider on this Ferris wheel?



I graphed the function in Desmos and found that the period is 120 and the maximum output value is 118. Therefore, the Ferris wheel takes 120 seconds to complete one revolution and the maximum height a rider reaches is 118 feet above the ground.



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QUESTION 6 What else did you learn that was not reflected in Questions 1-5?



Answers will vary.

QUESTION 7 Compare your answers to these questions now to your answers from the earlier attempt. What do you notice about your progress?



Answers will vary. Look for students to explain what they know now compared to what they knew when responding to the pre-test.