

Grade Book Detail

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7.3

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Last change: February 14, 2021, 11:44 pm  
Total time questions were on-screen: 206.7 minutes.

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A point starts at the location (2, 0) and moves counter-clockwise along a circular path with a radius of 2 units that is centered at the origin of an  $x$ - $y$  plane. An angle with its vertex at the circle's center has a measure of  $\theta$  radians and subtends the path the point travels. Let  $x$  represent the point's  $x$ -coordinate. (Draw a diagram of this to make sure you understand the context!)

a. Complete the following statements.

- As  $\theta$  varies from 0 to  $\frac{\pi}{2}$ ,  $x$  varies from  to  units.
- As  $\theta$  varies from  $\frac{\pi}{2}$  to  $\pi$ ,  $x$  varies from  to  units.
- As  $\theta$  varies from  $\pi$  to  $\frac{3\pi}{2}$ ,  $x$  varies from  to  units.
- As  $\theta$  varies from  $\frac{3\pi}{2}$  to  $2\pi$ ,  $x$  varies from  to  units.

b. Based on your answers to part a, sketch a graph of the relationship between  $x$  and  $\theta$ . (Represent  $\theta$  on the horizontal axis and  $x$  on the vertical axis.)

The graph shows a cosine wave on a coordinate plane. The horizontal axis is labeled  $\theta$  and has tick marks at  $\pi/2$ ,  $\pi$ ,  $3\pi/2$ , and  $2\pi$ . The vertical axis has tick marks at -2, -1, 1, and 2. The curve starts at (0, 2), crosses the  $\theta$ -axis at  $\pi/2$ , reaches a minimum at  $(\pi, -2)$ , crosses the  $\theta$ -axis at  $3\pi/2$ , and ends at  $(2\pi, 2)$ . A green box with 'Clear All' and a waveform icon is at the bottom left of the graph area.

Show Answer  
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Question 1: 5 out of 5 in 4 attempt(s)

Consider the angle shown below that has a radian measure of  $\theta$ . A circle with a radius of 2.7 cm is centered at the angle's vertex, and the terminal point is shown.

A circle with radius 2.7 cm is centered at the origin of a coordinate plane. An angle  $\theta$  is shown in standard position, with its terminal side passing through a point on the circle. A right triangle is formed with the origin, the point on the circle, and its projection onto the x-axis. The horizontal leg (adjacent) is labeled 1.68 cm, and the vertical leg (opposite) is labeled 2.1 cm. The radius is labeled 2.7 cm.

a. The terminal point's horizontal distance to the right of the center of the circle is  times as large as the radius of the circle, and therefore:  
 $\cos(\theta) =$   Preview

b. The terminal point's vertical distance above the center of the circle is  times as large as the radius of the circle, and therefore:  
 $\sin(\theta) =$   Preview

Show Answer  
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Question 2: 4 out of 4 in 1 attempt(s)

You can drag the terminal point in the applet below to adjust the openness of the given angle. As you drag the point, the angle's measurement in radians ( $\theta$ ) will be shown.

A unit circle is shown on a coordinate plane. A blue ray starts at the origin and passes through a red terminal point on the circle. The angle  $\theta$  is labeled as 0.00.

By using the applet above, fill in the table of values below.

$\theta$	$\cos(\theta)$
0	<input type="text" value="1"/>
$\frac{\pi}{2} \approx 1.57$	<input type="text" value="0"/>
$\pi \approx 3.14$	<input type="text" value="-1"/>
$\frac{3\pi}{2} \approx 4.71$	<input type="text" value="0"/>
$2\pi \approx 6.28$	<input type="text" value="1"/>

Now, sketch a graph of  $h = \cos(\theta)$  based on the information in the table above.

The graph shows a cosine wave on a coordinate plane. The horizontal axis is labeled  $\theta$  and has tick marks at  $\pi/2$ ,  $\pi$ ,  $3\pi/2$ , and  $2\pi$ . The vertical axis has tick marks at -1 and 1. The curve starts at (0, 1), crosses the  $\theta$ -axis at  $\pi/2$ , reaches a minimum at  $(\pi, -1)$ , crosses the  $\theta$ -axis at  $3\pi/2$ , and ends at  $(2\pi, 1)$ . A green box with 'Clear All' and a waveform icon is at the bottom left of the graph area.

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Question 3: 3 out of 3 in 5 attempt(s)

You can drag the terminal point in the applet below to adjust the openness of the given angle. As you drag the point, the angle's measurement in radians ( $\theta$ ) will be shown.

A unit circle is shown on a coordinate plane. A blue ray starts at the origin and passes through a red terminal point on the circle. The angle  $\theta$  is labeled as 0.01.

By using the applet above, fill in the table of values below.

$\theta$	$\sin(\theta)$
0	<input type="text" value="0"/>
$\frac{\pi}{2} \approx 1.57$	<input type="text" value="1"/>
$\pi \approx 3.14$	<input type="text" value="0"/>
$\frac{3\pi}{2} \approx 4.71$	<input type="text" value="-1"/>
$2\pi \approx 6.28$	<input type="text" value="0"/>

Now, sketch a graph of  $v = \sin(\theta)$  based on the information in the table above.

The graph shows a sine wave on a coordinate plane. The horizontal axis is labeled  $\theta$  and has tick marks at  $\pi/2$ ,  $\pi$ ,  $3\pi/2$ , and  $2\pi$ . The vertical axis has tick marks at -1 and 1. The curve starts at (0, 0), reaches a maximum at  $(\pi/2, 1)$ , crosses the  $\theta$ -axis at  $\pi$ , reaches a minimum at  $(3\pi/2, -1)$ , and ends at  $(2\pi, 0)$ . A green box with 'Clear All' and a waveform icon is at the bottom left of the graph area.

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Question 4: 3 out of 3 in 2 attempt(s)

Let  $\theta$  represent the radian measure of the angle below. By dragging the terminal point in the applet, adjust the given angle so that  $\cos(\theta) \approx -0.99$  and  $\sin(\theta) \approx 0.14$ .

A unit circle is shown on a coordinate plane. An angle  $\theta$  is shown in standard position, with its terminal side passing through a point on the circle. A right triangle is formed with the origin, the point on the circle, and its projection onto the x-axis. The horizontal leg (adjacent) is labeled 2.47 cm, and the vertical leg (opposite) is labeled 0.89 cm. The radius is labeled 2.5 cm.

Show Answer

Question 5: 1 out of 1 in 1 attempt(s)

Consider the angle shown below that has a radian measure of 2.4 radians. A circle with a radius of 3.3 cm is centered at the angle's vertex, and the terminal point is shown.

A circle with radius 3.3 cm is centered at the origin of a coordinate plane. An angle of 2.4 rad is shown in standard position, with its terminal side passing through a point on the circle. A right triangle is formed with the origin, the point on the circle, and its projection onto the x-axis. The horizontal leg (adjacent) is labeled 3.3 cm, and the vertical leg (opposite) is labeled 2.4 rad.

Note: Sine and cosine may appear in your answer. For instance, if the answer is cosine of 1 radian, you can write  $\cos(1)$ .

a. What is the terminal point's distance to the right of the center of the circle *measured in radius lengths*?  
 $\cos(2.4)$  Preview

b. What is the terminal point's distance to the right of the center of the circle *measured in cm*?  
 $3.3\cos(2.4)$  cm Preview

c. What is the terminal point's distance above the center of the circle *measured in radius lengths*?  
 $\sin(2.4)$  Preview

d. What is the terminal point's distance above the center of the circle *measured in cm*?  
 $3.3\sin(2.4)$  cm Preview

Show Answer  
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Question 6: 4 out of 4 in 19 attempt(s)

The angle below has a measure of 5.2 radians.

A unit circle is shown on a coordinate plane. An angle of 5.2 rad is shown in standard position, with its terminal side passing through a point on the circle. A right triangle is formed with the origin, the point on the circle, and its projection onto the x-axis. The horizontal leg (adjacent) is labeled 5.2 rad, and the vertical leg (opposite) is labeled 5.2 rad. The point on the circle is labeled (x, y).

Determine the exact coordinates of the terminal point  $(x, y)$ .

- $x =$   Preview
- $y =$   Preview

Show Answer  
Show Answer

Question 7: 2 out of 2 in 1 attempt(s)

Isaac is skiing on a circular ski trail that has a radius of 0.9 km. Isaac starts at the 3-o'clock position and travels 2.1 km in the counter-clockwise direction.

a. How many radians does Isaac sweep out?

radians Preview

b. When Isaac stops skiing, how many km is Isaac to the right of the center of the ski trail?

km Preview

c. When Isaac stops skiing, how many km is Isaac above of the center of the ski trail?

km Preview

Show Answer  
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Show Answer

Question 8: 3 out of 3 in 14 attempt(s)

Kristin boards a Ferris wheel at the 3-o'clock and rides the Ferris wheel for one full rotation (as shown below). The radius of the Ferris wheel is 12 meters. Let  $s$  represent the varying number of meters Kristin has traveled along the circular path since the ride started.

A Ferris wheel is shown on a coordinate plane. The center is at the origin. The radius is 12 meters. Kristin is shown at the 3-o'clock position, which is (12, 0). The Ferris wheel has 8 spokes and 8 green cars.

a. Write an expression (in terms of  $s$ ) to represent the number of radians Kristin has swept out since the ride started.  
 $s/12$  Preview

b. Write an expression (in terms of  $s$ ) to represent Kristin's height above the center of the Ferris wheel *measured in radius lengths*.  
 $\sin(s/12)$  Preview

c. Write an expression (in terms of  $s$ ) to represent Kristin's height above the center of the Ferris wheel *measured in meters*.  
 $12\sin(s/12)$  Preview

Show Answer  
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Question 9: 3 out of 3 in 2 attempt(s)

The vertex of the angle below is at  $(0, 0)$ , and a circle with a radius of  $r$  units is centered at the vertex of the angle. The angle has a measure of  $\theta$  radians.

A circle with radius  $r$  is centered at the origin of a coordinate plane. An angle  $\theta$  is shown in standard position, with its terminal side passing through a point on the circle. A right triangle is formed with the origin, the point on the circle, and its projection onto the x-axis. The horizontal leg (adjacent) is labeled  $r$ , and the vertical leg (opposite) is labeled  $y$ . The point on the circle is labeled  $(x, y)$ .

What are the coordinates of the terminal point,  $(x, y)$ ? (Your answers should be expressions in terms of  $r$  and  $\theta$ )

- $x =$   Preview
- $y =$   Preview

Hint: enter "theta" for  $\theta$ .

Show Answer  
Show Answer

Question 10: 2 out of 2 in 2 attempt(s)

Total: 30/30

Categorized Score Breakdown

Category Points Earned / Possible (Percent)

30 / 30 (100 %)