

The Unit Circle II (4.2)

Quiz 5C

1. Solve: $3x^2 + 8x^2 + 3x = 2$
 $11x^2 + 3x - 2 = 0$
 $(11x - 2)(x + 1) = 0$
 $11x - 2 = 0 \rightarrow x = \frac{2}{11}$
 $x + 1 = 0 \rightarrow x = -1$
 $x = \frac{2}{11}, -1$

2. Find all intercepts and sketch $y = x^2 - 4x^2 + x + 6$
 $y = -3x^2 + x + 6$
 $-3x^2 + x + 6 = 0$
 $3x^2 - x - 6 = 0$
 $(3x + 2)(x - 3) = 0$
 $3x + 2 = 0 \rightarrow x = -\frac{2}{3}$
 $x - 3 = 0 \rightarrow x = 3$
y-intercept: $y = 6$
Sketch:

3. Write the equation of the polynomial from the graph. Do not expand.

 $y = (x + 1)(x - 2)$

 $y = (x + 2)(x - 3)$

5. Tupperware designs their rectangular containers so that the length is two more than the width, and the height is 3 times the width. If the volume of a container is 1920 cm³, what are the dimensions?

$x(x+2)(3x) = 1920$
 $3x^2(x+2) = 1920$
 $3x^3 + 6x^2 - 1920 = 0$
 $x^3 + 2x^2 - 640 = 0$
 $(x - 8)(x^2 + 10x + 80) = 0$
 $x - 8 = 0 \rightarrow x = 8$
Dimensions: $8 \times 10 \times 24$ cm

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4. If $P(\theta)$ is the point at the intersection of the terminal arm of angle θ and the unit circle, determine the exact coordinates of each of the following.

a) $P(\pi)$
b) $P(-\frac{\pi}{2})$
c) $P(\frac{\pi}{3})$
d) $P(-\frac{\pi}{6})$
e) $P(\frac{3\pi}{4})$
f) $P(-\frac{7\pi}{4})$
g) $P(4\pi)$
h) $P(\frac{5\pi}{2})$
i) $P(\frac{5\pi}{6})$
j) $P(-\frac{4\pi}{3})$

5. Identify a measure for the central angle θ in the interval $0 \leq \theta < 2\pi$ such that $P(\theta)$ is the given point.

a) $(0, -1)$
b) $(1, 0)$
c) $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
d) $(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}})$
e) $(\frac{1}{2}, \frac{\sqrt{3}}{2})$
f) $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$
g) $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$
h) $(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$
i) $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$
j) $(-1, 0)$

10. Mya claims that 0 and 1 can be used to find the x and y coordinates of a point on the unit circle. Do you agree? Why or why not?

Mya showed that the y-coordinate of $\theta = 1 - (0.8077)^2 \approx 0.348751$. The point on the unit circle is $(1, 0.348751)$. How can you show she is correct? If not, what is the correct point?

If $y = 0.2571$, is the point on the unit circle?

Handwritten notes:

$\pi/2, 5\pi/6, 10$

x, y

Diagram 1: Right triangle with angle θ , hypotenuse 1, adjacent $\frac{1}{2}$, opposite $\frac{\sqrt{3}}{2}$. Angle is $\frac{\pi}{3}$.

Diagram 2: Right triangle with angle θ , hypotenuse 1, adjacent $\frac{1}{2}$, opposite $\frac{\sqrt{3}}{2}$. Angle is $\frac{\pi}{3}$.

Diagram 3: Unit circle with point $(\frac{1}{2}, \frac{\sqrt{3}}{2})$ at angle $\frac{\pi}{3}$.

Handwritten notes:

$\frac{\pi}{3}$

30°

60°

1

$\frac{\sqrt{3}}{2}$

Soh
rah
toa

Diagram 1: Right triangle with angle 30°, hypotenuse 2, adjacent $\sqrt{3}$, opposite 1.

Diagram 2: Unit circle with point $(\frac{\sqrt{3}}{2}, \frac{1}{2})$ at angle $\frac{\pi}{6}$.

Diagram 3: Unit circle with point $(\frac{1}{2}, \frac{\sqrt{3}}{2})$ at angle $\frac{\pi}{3}$.

Handwritten notes:

30°

60°

1

$\frac{\sqrt{3}}{2}$

Diagram 1: Right triangle with angle 30°, hypotenuse 2, adjacent $\sqrt{3}$, opposite 1.

Diagram 2: Unit circle with point $(\frac{\sqrt{3}}{2}, \frac{1}{2})$ at angle $\frac{\pi}{6}$.

Diagram 3: Unit circle with point $(\frac{1}{2}, \frac{\sqrt{3}}{2})$ at angle $\frac{\pi}{3}$.

The Unit Circle II (4.2)

ex1: Find the x and y co-ordinates for the endpoints on the unit circle for the $\frac{\pi}{6}$ family.

30°

Diagram 1: Right triangle with angle 30°, hypotenuse 2, adjacent $\sqrt{3}$, opposite 1.

Diagram 2: Right triangle with angle 30°, hypotenuse 2, adjacent $\sqrt{3}$, opposite 1.

Diagram 3: Unit circle with points $(\frac{\sqrt{3}}{2}, \frac{1}{2})$ at $\frac{\pi}{6}$ and $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$ at $\frac{5\pi}{6}$.

Diagram 4: Unit circle with points $(\frac{1}{2}, \frac{\sqrt{3}}{2})$ at $\frac{\pi}{3}$ and $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$ at $\frac{2\pi}{3}$.

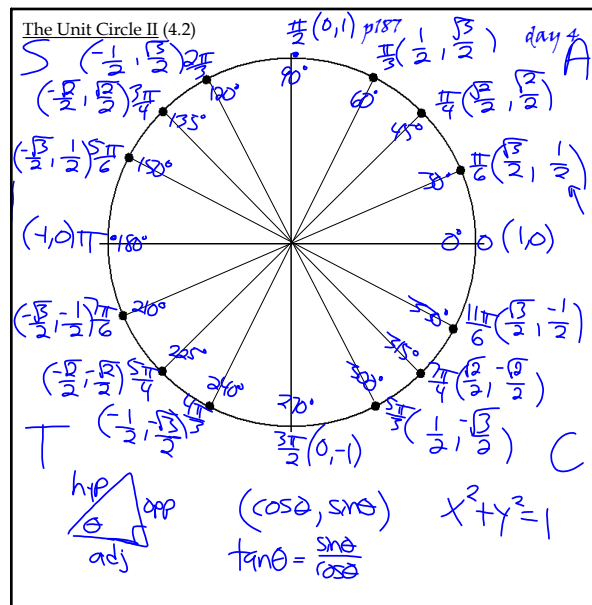
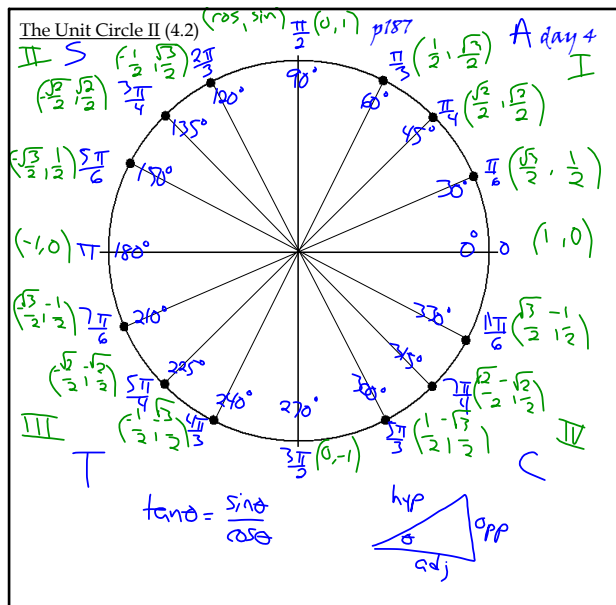
Diagram 5: Unit circle with points $(\frac{\sqrt{3}}{2}, -\frac{1}{2})$ at $\frac{7\pi}{6}$ and $(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$ at $\frac{11\pi}{6}$.

The Unit Circle II (4.2)

ex2: Repeat the exercise for the $\frac{\pi}{4}$ family.

Diagram 1: Unit circle with points $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$ at $\frac{\pi}{4}$ and $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$ at $\frac{3\pi}{4}$.

Diagram 2: Unit circle with points $(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$ at $\frac{7\pi}{4}$ and $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$ at $\frac{5\pi}{4}$.



The Unit Circle II (4.2) *p187* *day 4*

4efghj

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c) $P(\frac{\pi}{3})$	d) $P(-\frac{\pi}{6})$
e) $P(\frac{3\pi}{4})$	f) $P(-\frac{7\pi}{4})$
g) $P(4\pi)$	h) $P(\frac{5\pi}{2})$
i) $P(\frac{5\pi}{6})$	j) $P(-\frac{4\pi}{3})$

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5. Identify a measure for the central angle θ in the interval $0 \leq \theta < 2\pi$ such that $P(\theta)$ is the given point.

a) $(0, -1)$	b) $(1, 0)$
c) $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$	d) $(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}})$
e) $(\frac{1}{2}, \frac{\sqrt{3}}{2})$	f) $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$
g) $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$	h) $(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$
i) $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$	j) $(-1, 0)$

The Unit Circle II (4.2) *p187* *day 4*

#W: p187#6, 13, 15

$\frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$


The Unit Circle II (4.2) *p187* *day 4*

The woman who remembers everything.

The man who can't remember anything.

Who is happier? Why?

Attachments

 quiz5.pdf