Worksheet 6

MATH 006B - Schmidt

Winter 2021

Instructions:

- **Show ALL your work to receive credit!** Cross off anything you do not wish to be graded.
- Simplify your answers as much as possible. For instance, evaluate 2^2, but not $\sqrt{2}$.
- **Work with your group** on the following exercises. Each of you will turn in your own work via Gradescope.
- **Your group** may ask the TA questions, which the TA will answer with leading questions (not answers) to help guide you to the answer.

1. (6 points) Consider the angle pictured below. Some answers may involve the cosine and/or sine functions. Leave your answers in exact form.
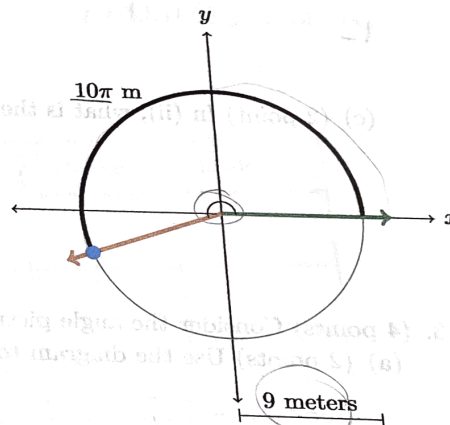
   (a) (2 points) What is the measure of the angle? *Include units.*

   $$S = r\theta$$

   $$9 \text{ meters} \quad \& \quad 10\pi \text{ m}$$

   $$S = \frac{r\theta}{r} \qquad \frac{S = r\theta}{r}$$

   $$\frac{10\pi}{9} = \theta$$

   10π m

   9 meters

   1 radius length 9

   (b) (2 points) What are the coordinates of the terminal point in units of radius lengths?

   $$\cos\left(10\pi\right), \ \sin\left(10\pi\right)$$

   (c) (2 points) What are the coordinates of the terminal point in meters?

   $$\left(9\cos\left(10\pi\right), \ 9\sin\left(10\pi\right)\right)$$

   $$(x,y) \to \left(\cos, \sin\right)$$

2. (4 points) The following questions are about the pictures below:

(i) $\frac{7\pi}{6}$, x, 12 in

(ii) 180°, 5 radians, 20 ft, x, $\partial°$, 4 radians
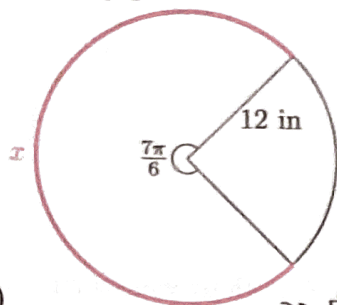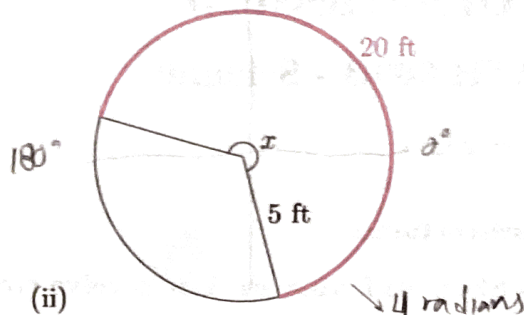
(a) (1 point) In (i), what proportion of the circumference of the circle is the red arc length?

$$\frac{7\pi}{6} \rightarrow 210°$$

$$\frac{210}{360} \rightarrow \frac{21\div 3}{36\div 3} \rightarrow \frac{7}{12}$$

12 in

The proportion of the circumference is $\frac{7}{12}$.
↳ 0.5833

(b) (1 point) In (i), how long is the red arc length x, in inches?

radius is 12 inch

$$12\left(\frac{7\pi}{6}\right)$$

$V = 43.97$ inches

$$C = \pi d$$

$$C = 2\pi r \rightarrow C = 2\pi \cdot 12 \rightarrow C = 24\pi$$
$$C = 75.39$$

0.5833 · 75.39
↳ 43 ans

(c) (2 point) In (ii), what is the measure x of the angle depicted? Include units.

Proportion: $\frac{20}{10\pi} = \frac{2}{\pi}$ $\frac{2}{\pi} \cdot 360 = 22$ 150°
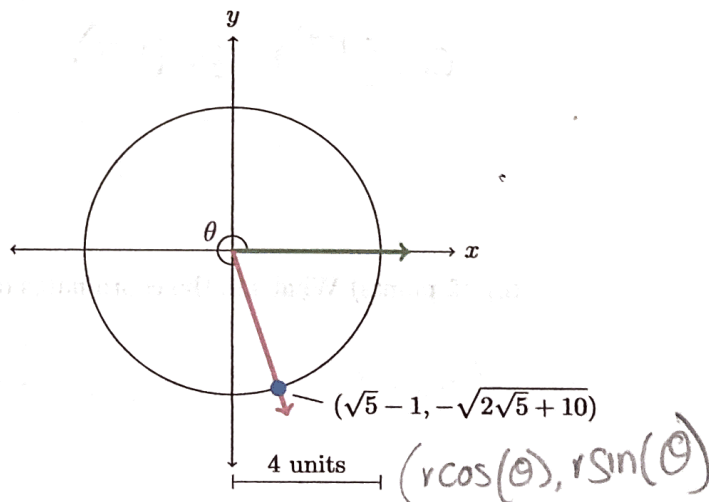
arcumfvence: $2\pi(5) = 10\pi$

$X = 150°$

3. (4 points) Consider the angle pictured below. Leave your answers in exact form.
   (a) (2 points) Use the diagram to find $\sin(\theta)$.

$$\sin(\theta) = \frac{-\sqrt{2\sqrt{5}+10}}{4}$$

(b) (2 points) Use the diagram to find $\cos(\theta)$.

$$\cos(\theta) = \frac{\sqrt{5}-1}{4}$$

$(\sqrt{5}-1, -\sqrt{2\sqrt{5}+10})$

4 units $(r\cos(\theta), r\sin(\theta))$

4. (1 point) Participation – no submission

2