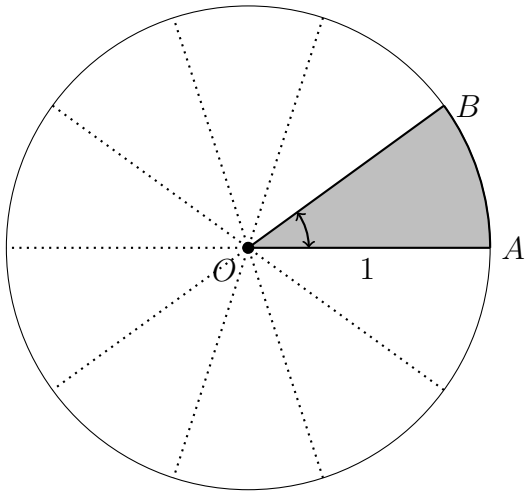
8.2 Sector calculations

1. Do Now: Convert each set of units. One inch $= \frac{1}{12}$ foot or one foot $= 12$ inches.

   (a) How many feet are 30 inches?

   (b) How many inches are 8.25 feet?

2. Do Now: The shaded sector of the unit circle is *one tenth* of the whole circle, as shown.



(a) Write down the circumference in terms of π. ($C = 2\pi r$)

(b) Find $m\angle AOB$ in *degrees*.

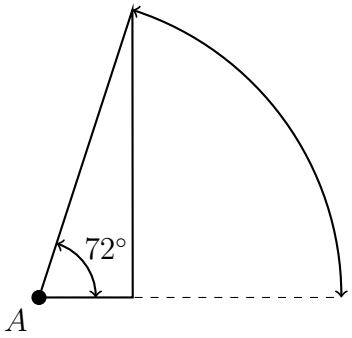
(c) Find $m\angle AOB$ in *radians*.

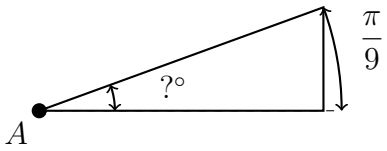
3. Convert equivalent angle measures between *radians* and *degrees* ($2\pi = 360°$, $\pi = 180°$).

   Apply the appropriate formula.

   $r = d \times \dfrac{\pi}{180}$ $\qquad$ $d = r \times \dfrac{180}{\pi}$

   (a) $72° =$? radians $\qquad$ (b) $\dfrac{\pi}{9} =$? degrees





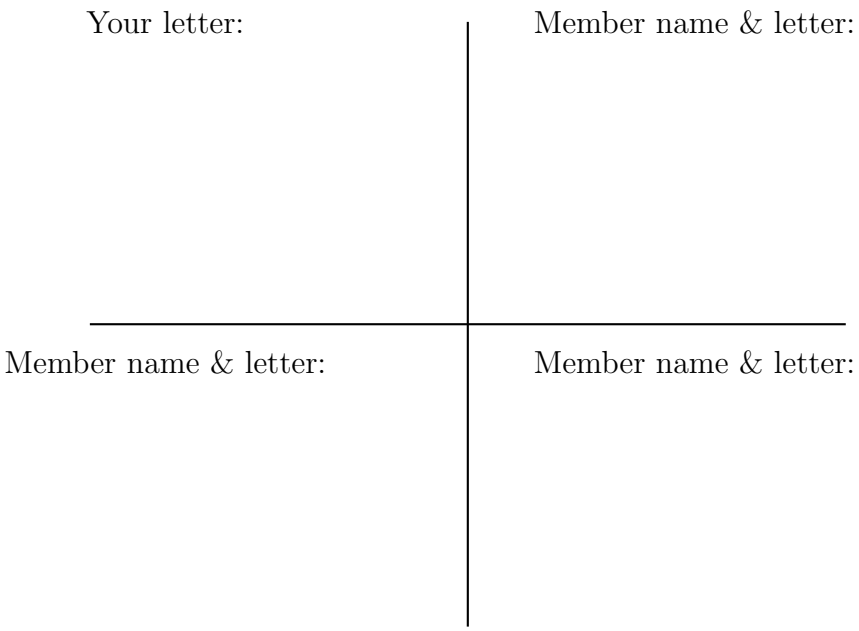
4. Groupwork: Each member picks a different color and Greek letter to write on other members' slides.

   (a) Hand write yours in the upper left quadrant first.

   (b) In the breakout room, student with the shortest first name "raises his/her hand" and other members come to "help" him/her.

   (c) Each student writes his/her name and letter into a different quadrant. (better: copy/paste screenshot)

   (d) Repeat with each team member.



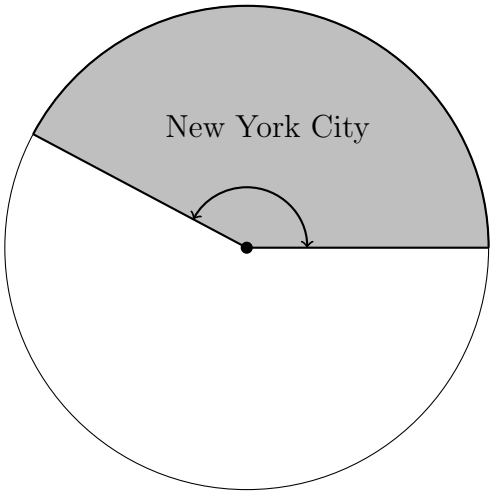
Example Greek letters are π, θ, α, Δ, β, σ, Σ, ϵ

5. Lesson: *Pie charts* represent proportions using sector areas and central angles.

   (a) Population of NY City is 8,340,000
   Population of NY State is 19,500,000

   (b) Find the fraction of New Yorkers, x, who reside in NYC as a percentage.

   (c) Find the central angle of the shaded area, $\theta = x \times 360^\circ$

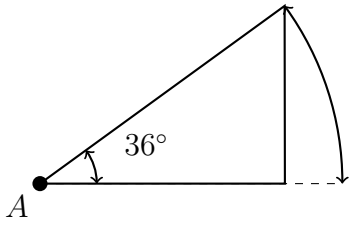


6. Practice: Convert between *radians* to *degrees* knowing $2\pi = 360^\circ$ or $\pi = 180^\circ$.

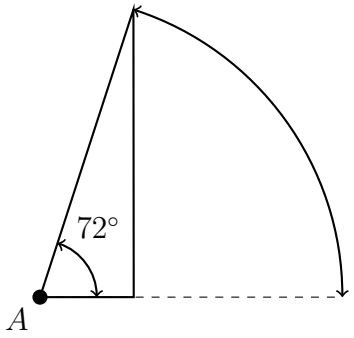
   Apply the appropriate formula. Leave radians in terms of π.

   $r = d \times \dfrac{\pi}{180}$ $\qquad$ $d = r \times \dfrac{180}{\pi}$

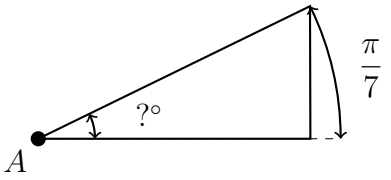
   (a) 36° = ? radians



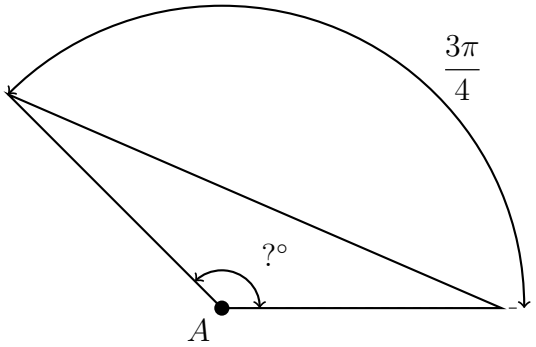
   (b) 72° = ? radians



   (c) $\dfrac{\pi}{7}$ = ? degrees



   (d) $\dfrac{3\pi}{4}$ = ? degrees



7. Right $\triangle ABC$ is drawn in *standard position* with vertex A on the origin and right $\angle C$ on the x-axis, as shown.

   (a) Find the length of the hypotenuse AB using the Pythagorean Theorem $a^2 + b^2 = c^2$. (leave as a radical)

   (b) Find the slope of the line segment $\overline{AB}$ as a decimal.