Today's Plan:

Learning Target (standard): I will plot points in polar form.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

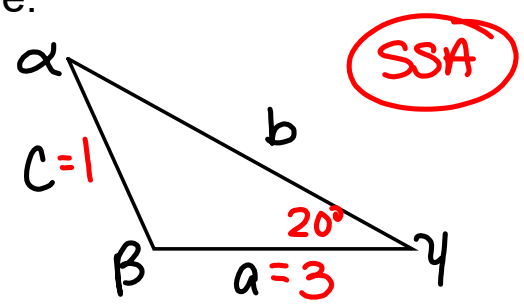
Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Solve the triangle:

$a = 3in$

$c = 1in$

$\gamma = 20°$



SSA

$\frac{\sin\alpha}{a} = \frac{\sin\gamma}{c}$

$\frac{\sin\alpha}{3} = \frac{\sin 20°}{1}$

$\sin\alpha = 3\sin 20°$

$\sin\alpha = 1.026 > 1$

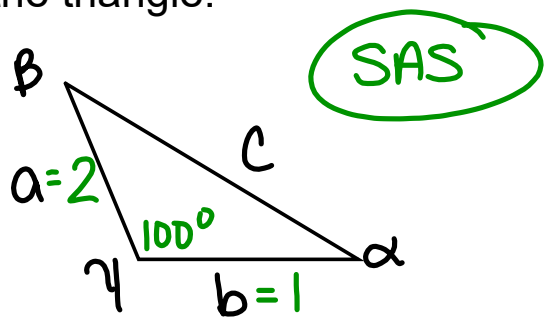
no triangle

Find the area of the triangle:

$a = 2cm$

$b = 1cm$

$\gamma = 100°$



SAS

$A = \frac{1}{2}ab\sin\gamma$

$A = \frac{1}{2}(2)(1)\sin 100°$

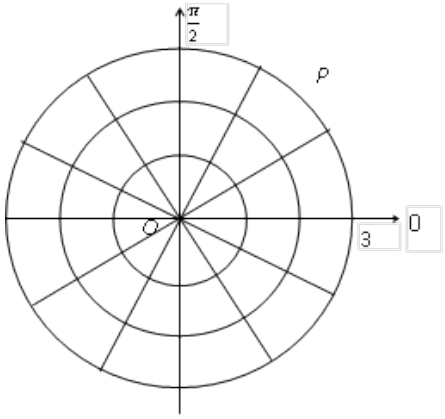
$A = \sin 100°$

$A = 0.985\ cm^2$

Polar Coordinates

A **polar coordinate system** is a system to plot points in a plane with a point O in the center of a circular grid.

(r, θ)



The **Pole** is the point *O*, the origin.

Polar Axis the horizontal ray from *O* pole (origin) to the right.

Polar Coordinates of each point in the plane $P = (r, \theta)$

r = **Directed distance** from *O* to *P*.

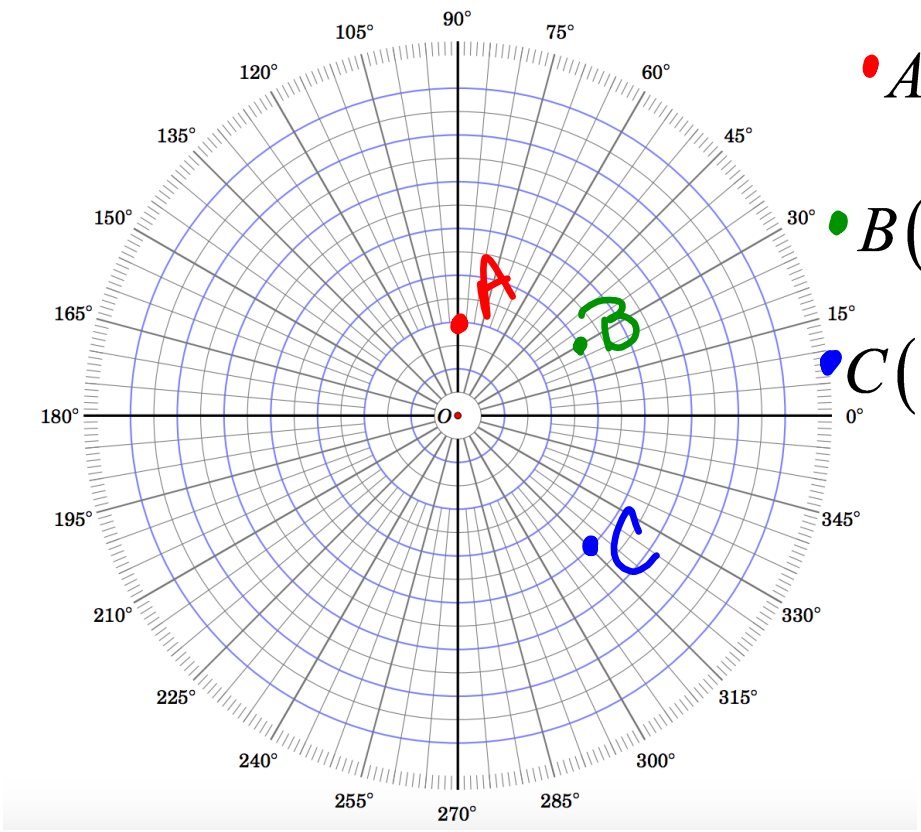
θ = **Directed angle** in a counter-clockwise direction from polar axis to *OP*.

Plotting Polar Coordinates:

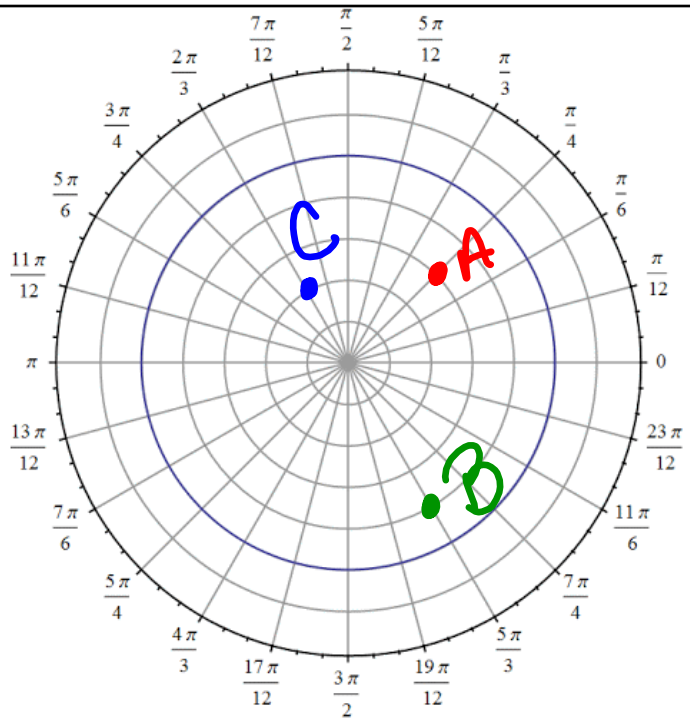
- measure the provided trigonometric angle
- count off the ***r*** on the terminal side of the angle if ***r*** is positive
- count off the ***r*** in the direction opposite the terminal side of the angle if ***r*** is negative

rectangular coordinate (x, y)

polar coordinate (r, θ)



- $A(3, 90°)$
- $B(-5, 210°)$
- $C(-7, -225°)$

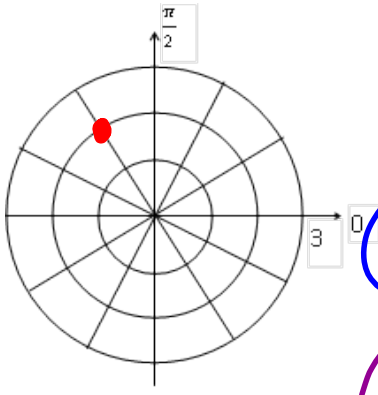


- $A\left(3, \frac{\pi}{4}\right)$
- $B\left(-4, \frac{2\pi}{3}\right)$
- $C\left(-2, -\frac{\pi}{3}\right)$

Finding all Polar Coordinates of a Point

EX#2: Plot the point $\left(2, \frac{2\pi}{3}\right)$

Find three additional polar representations of this point on $[-2\pi, 2\pi]$



① $r < 0$

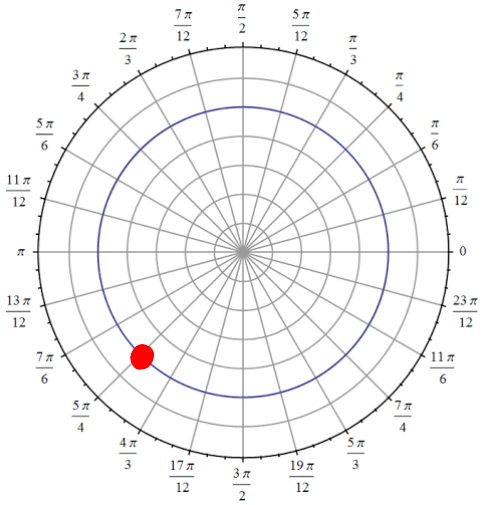
$\left(-2, -\frac{\pi}{3}\right)$

② $\left(-2, \frac{5\pi}{3}\right)$

③ $r > 0$

$\left(2, -\frac{4\pi}{3}\right)$

Plot the point given in polar coordinates and find the other polar coordinates fitting the requirements.



$\left(5, \frac{5\pi}{4}\right)$

$a) r > 0, -2\pi \le \theta < 0$

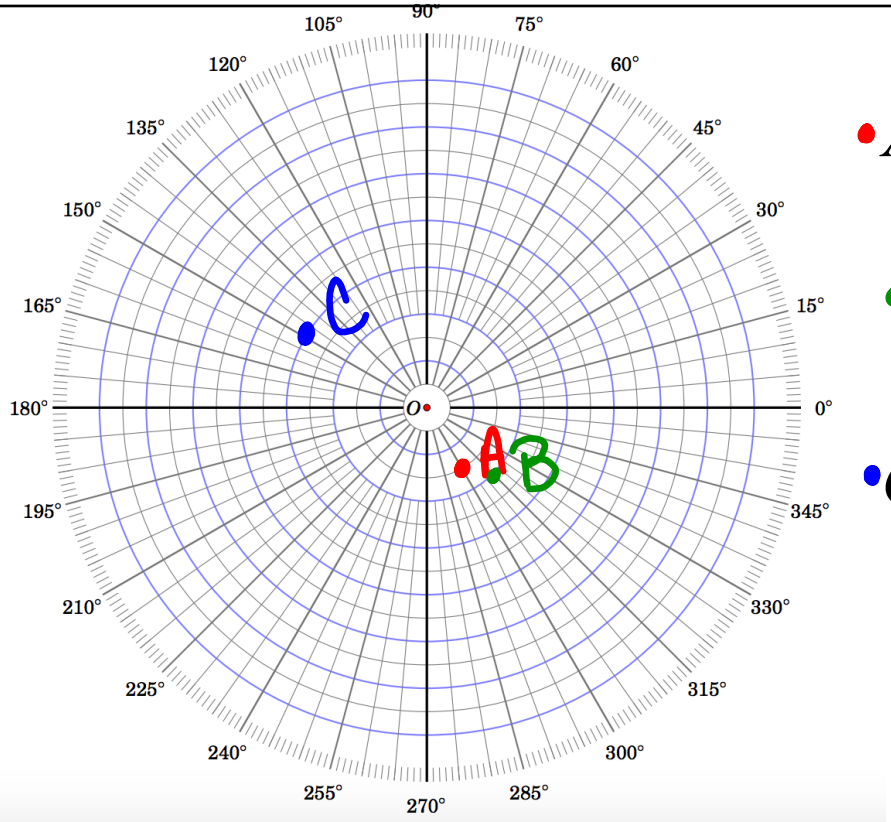
$\left(5, -\frac{3\pi}{4}\right)$

$b) r < 0, 0 \le \theta < 2\pi$

$\left(-5, \frac{\pi}{4}\right)$

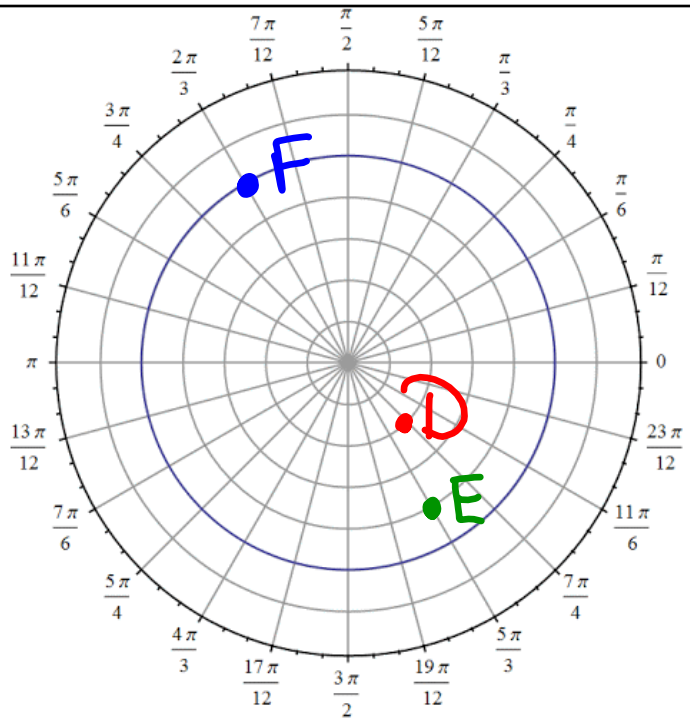
$c) r > 0, 2\pi \le \theta < 4\pi$

$\left(5, \frac{13\pi}{4}\right)$



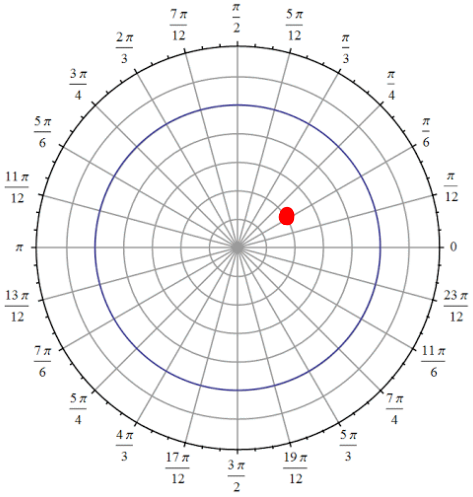
(r,θ)

- $A(-2,120°)$
- $B(3,315°)$
- $C(5,-210°)$



- $D\left(-2,\frac{3\pi}{4}\right)$
- $E\left(4,\frac{5\pi}{3}\right)$
- $F\left(5,-\frac{4\pi}{3}\right)$

Plot the point given in polar coordinates and find the other polar coordinates fitting the requirements.



$$\left(-2, \frac{7\pi}{6}\right)$$

$a) r > 0, -2\pi \le \theta < 0$

$\left(2, -\frac{11\pi}{6}\right)$

$b) r < 0, 0 \le \theta < 2\pi$

$\left(-2, \frac{\pi}{6}\right)$

$c) r > 0, 2\pi \le \theta < 4\pi$

$\left(2, \frac{13\pi}{6}\right)$

Assignment:

p.576 #2-28 even