

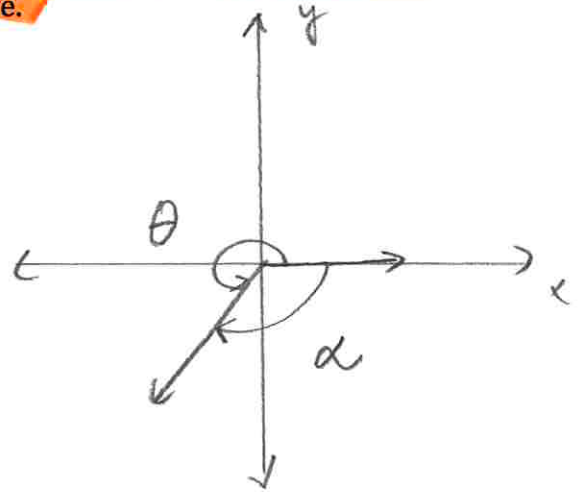
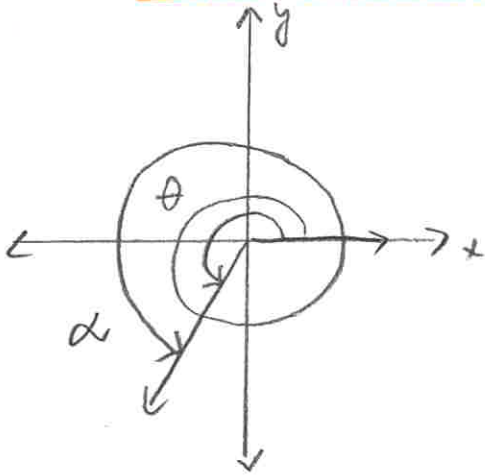
Notes:

PC11

Coterminal Angles

Coterminal angles are angles in standard position with a coinciding terminal arm.

Coterminal angles can be both, positive and negative.



It is possible to calculate angle measures for coterminal angles using the formula:

$$\alpha = \theta + n \cdot 360^\circ ; \text{ where } n \in \mathbb{Z}$$

Ex.1: Find two positive and two negative angles that are coterminal with $\theta = 80^\circ$.

$$\alpha = \theta + n \cdot 360^\circ$$

positive :

$n=1$ $\alpha_1 = 80^\circ + (1)(360^\circ)$

$\alpha_1 = 440^\circ$

$n=2$ $\alpha_2 = 80^\circ + (2)(360^\circ)$

$\alpha_2 = 800^\circ$

negative

$n=-1$

$\alpha_3 = 80^\circ + (-1)(360^\circ)$

$\alpha_3 = -280^\circ$

$n=-2$

$\alpha_4 = 80^\circ + (-2)(360^\circ)$

$\alpha_4 = -640^\circ$

Ex.2: Determine whether $\alpha = 960^\circ$ and $\beta = -120^\circ$ are coterminal angles. Support your answer.

$$\alpha = \theta + n 360^\circ ; \quad \text{Solve for } n \text{ and see} \\ \text{if } n \in \mathbb{Z}$$

$$960^\circ = -120^\circ + n 360^\circ \\ + 120^\circ \quad + 120^\circ$$

$$\frac{1080^\circ}{360^\circ} = \frac{n 360^\circ}{360^\circ}$$

$$n = 3 \quad n \in \mathbb{Z} \quad \therefore \alpha \text{ and } \beta \text{ are coterminal} \\ \text{angles.}$$

Ex.3: Determine whether $\alpha = 1350^\circ$ and $\beta = 80^\circ$ are coterminal angles. Support your answer.

$$\alpha = \theta + n 360^\circ$$

$$1350^\circ = 80^\circ + n 360^\circ \\ - 80^\circ \quad - 80^\circ$$

$$\frac{1270^\circ}{360^\circ} = \frac{n 360^\circ}{360^\circ}$$

$$n = 3.52\bar{7}$$

$$n \notin \mathbb{Z}$$

$\therefore \alpha$ and β are not coterminal.