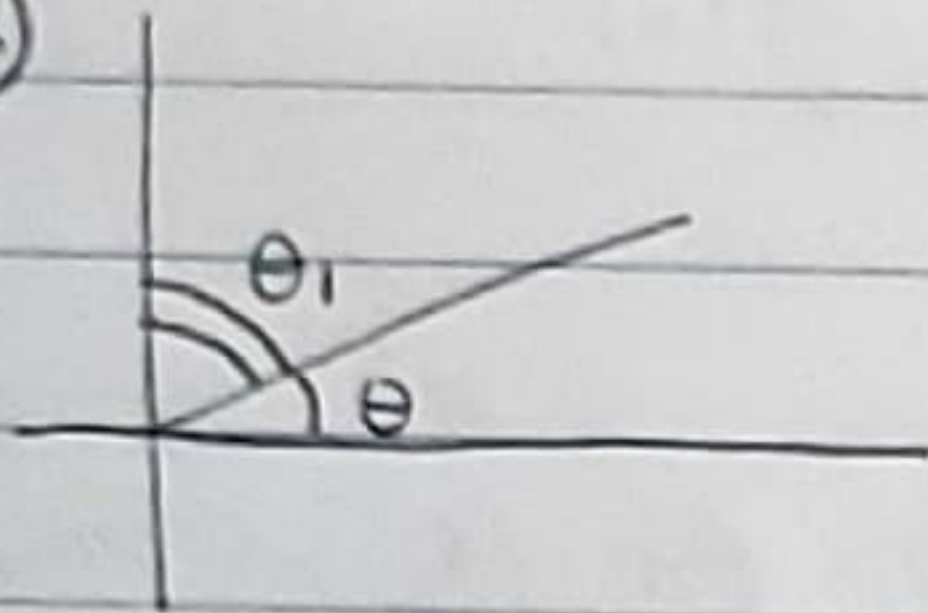


# Angle identities

01 MAY 2023

CAI - Compliment angle identities (cofunc)

(ex)

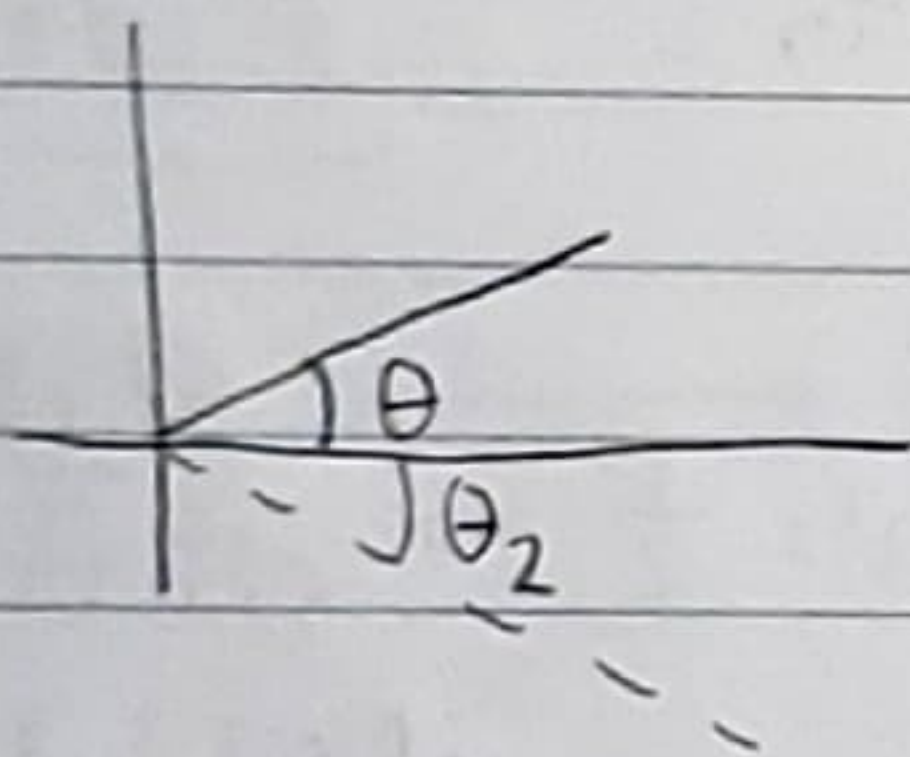


$\theta_1 =$  compliment angle of  $\theta$

$$\theta_1 + \theta = \overset{90^\circ}{\frac{\pi}{2}} \longrightarrow \theta_1 = \frac{\pi}{2} - \theta$$

NAI - negative angle identity

(ex)

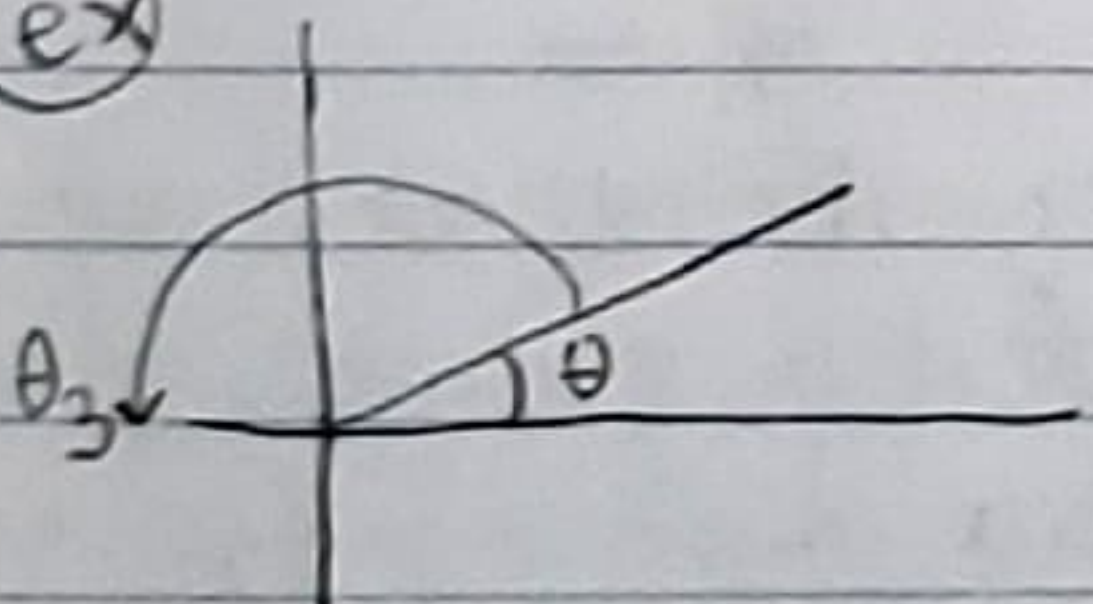


$\theta_2 =$  negative angle of  $\theta$

$$\theta_2 = -\theta$$

SAI - Supplement angle identity

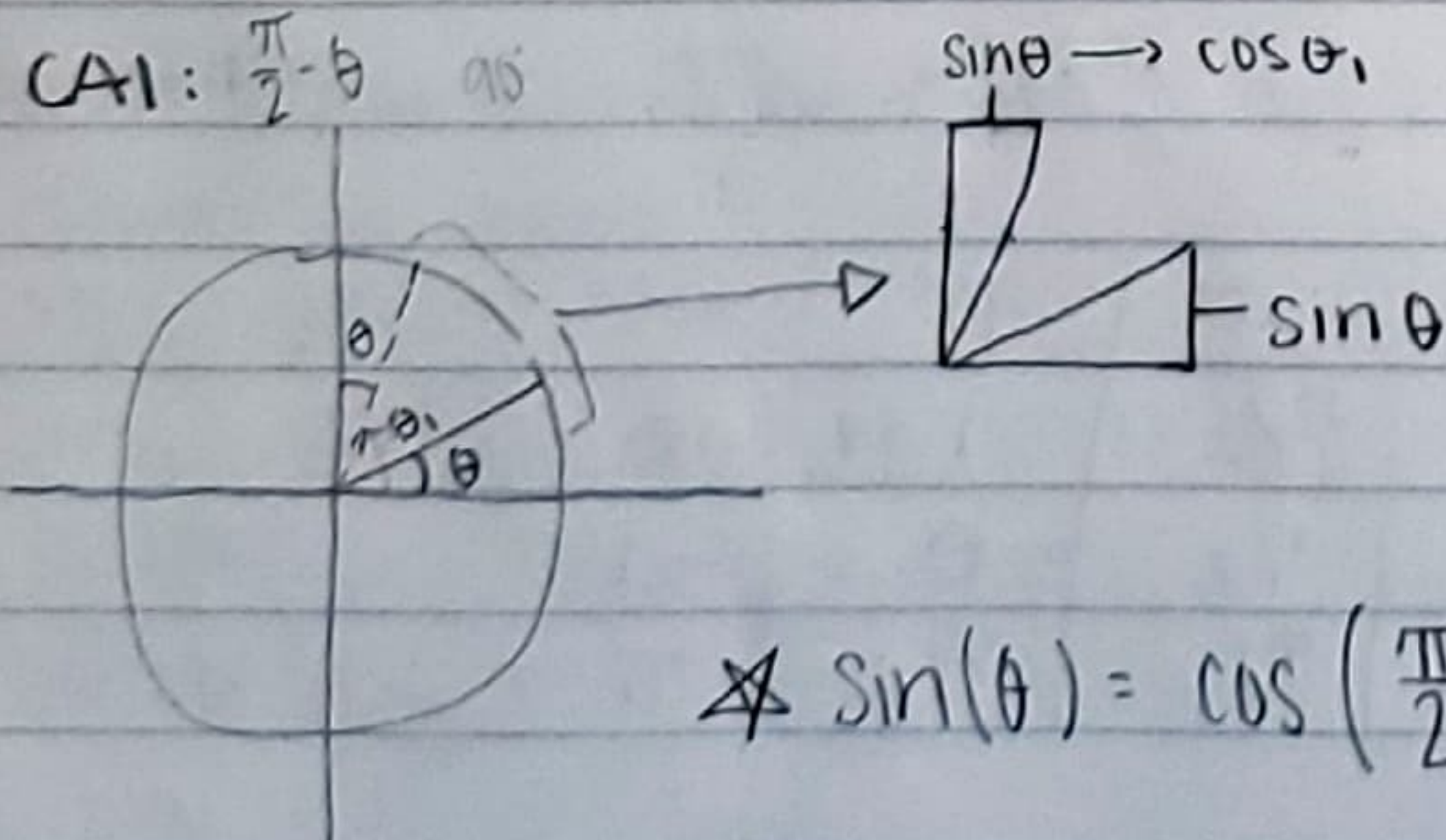
(ex)



$\theta_3 =$  Supplement angle of  $\theta$

$$\theta_3 = \overset{180^\circ}{\pi} - \theta$$

(ex) CAI:  $\frac{\pi}{2} - \theta$  90



$$\star \sin(\theta) = \cos\left(\frac{\pi}{2} - \theta\right)$$

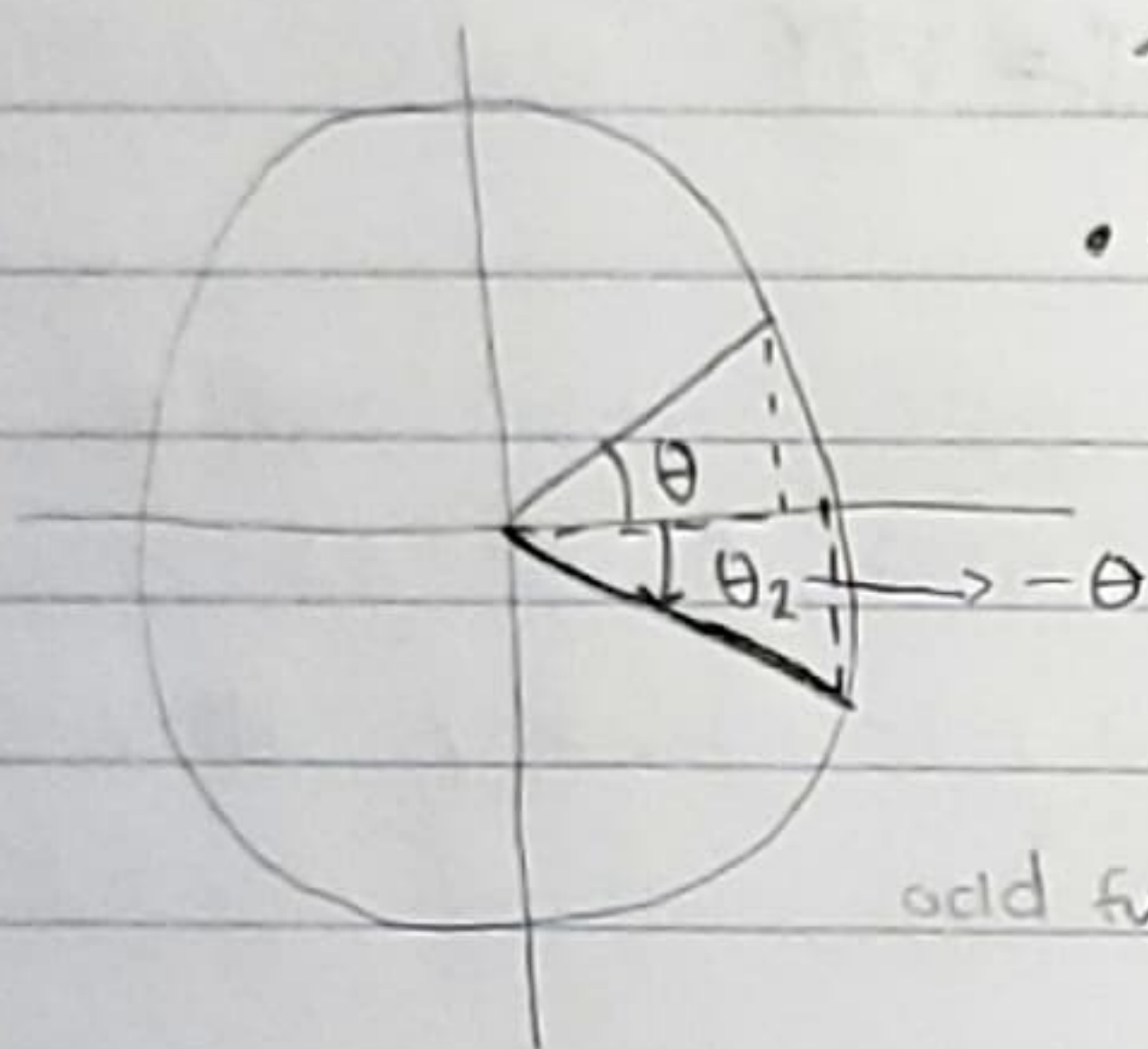
$$\star \cos(\theta) = \sin\left(\frac{\pi}{2} - \theta\right)$$

$$\tan(\theta) = \cot\left(\frac{\pi}{2} - \theta\right)$$

$$\sec(\theta) = \csc\left(\frac{\pi}{2} - \theta\right)$$



(ex) NAI:  $-\theta$



$\star \sin(-\theta) = -\sin(\theta) \rightarrow$  just  $-y$  coordinate of  $\theta$

$\star \cos(-\theta) = \cos(\theta) \rightarrow$  exact same #

odd func

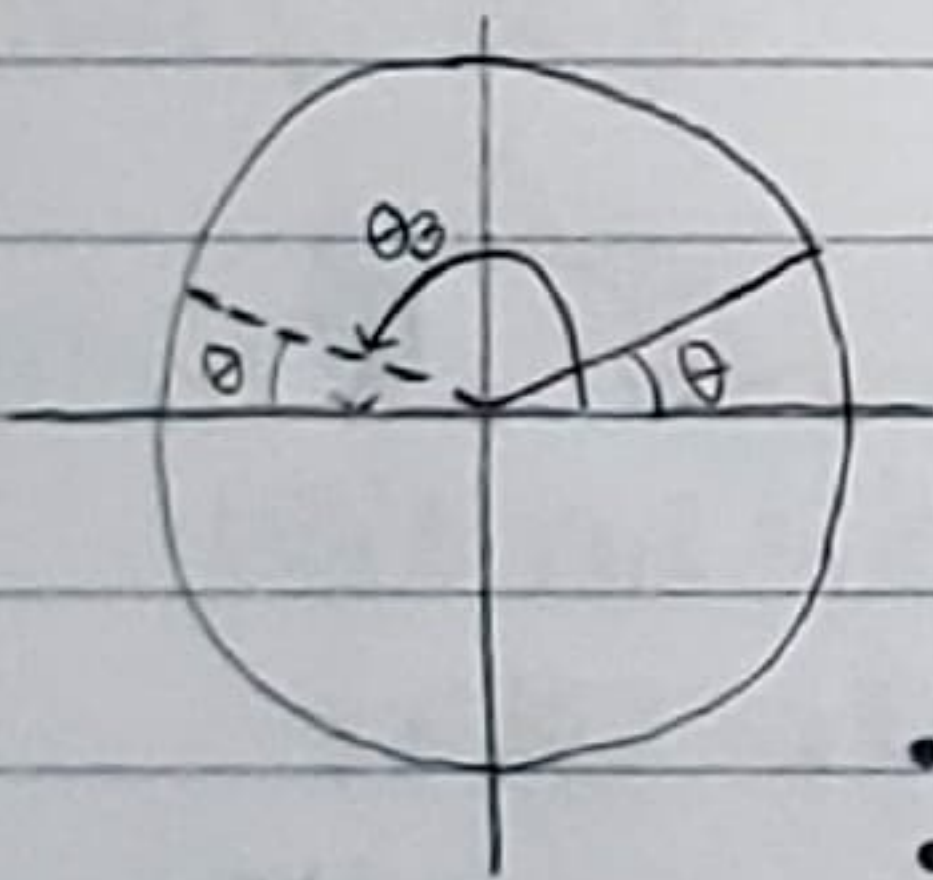
even func

odd func  $\left\{ \begin{aligned} \tan(-\theta) &= \frac{\sin(-\theta)}{\cos(-\theta)} = \frac{-\sin(\theta)}{\cos(\theta)} = -\tan(\theta) \\ \cot(\theta) &= -\cot(-\theta) \end{aligned} \right.$

$\sec(-\theta) = 1/\cos(-\theta) = 1/\cos(\theta) = \sec(\theta) \rightarrow$  even func

$\csc(-\theta) = 1/\sin(-\theta) = 1/(-\sin(\theta)) = -\csc(\theta) \rightarrow$  odd func

(ex) SAI:  $\pi - \theta$   $180^\circ$



$\star \sin(\pi - \theta) = \sin(\theta)$

$\star \cos(\pi - \theta) = -\cos(\theta)$

$\tan(\pi - \theta) = -\tan(\theta)$

$\cot(\pi - \theta) = -\cot(\theta)$

$\sec(\pi - \theta) = -\sec(\theta)$

$\csc(\pi - \theta) = \csc(\theta)$

for coordinates:  $(x, y) \rightarrow (-x, -y)$

$\theta \pm \pi$  results in the same answer

PRACTICE:

a)  $\sin(120^\circ) =$  SAI:  $\sin(60^\circ) = \sqrt{3}/2$

b)  $\cos(150^\circ) =$  SAI:  $-\cos(30^\circ) = -\sqrt{3}/2$

c)  $\tan(135^\circ) =$

d)  $\cos(225^\circ) =$

$\cos(\theta \pm \pi) = -\cos(\theta)$

$\sin(\theta \pm \pi) = -\sin(\theta)$

$\tan(\theta \pm \pi) = \tan(\theta)$

$\cot(\theta \pm \pi) = \cot(\theta)$

$\sec(\theta \pm \pi) = -\sec(\theta)$

$\csc(\theta \pm \pi) = -\csc(\theta)$