

MTH 113

Weds. 4-17-13

CLASS NOTES

Ch. 4-4 The Inverse Cotangent, Secant, and Cosecant Functions

i.e., the inverses of the reciprocal functions

$$\operatorname{Arccot}(x) = \cot^{-1}(x)$$

see pg 157

Domain: \mathbb{R}

Range: $0 < y < \pi$
QUAD. I, II

$$* \cot^{-1}(x) = \frac{\pi}{2} - \tan^{-1}(x)$$

A useful identity

$$\operatorname{Arcsec}(x) = \sec^{-1}(x) = \cos^{-1}\left(\frac{1}{x}\right) \text{ if } |x| \geq 1$$

QUAD. I/II } Range $\Rightarrow 0 \leq y \leq \pi, y \neq \frac{\pi}{2}$

Domain

$$\operatorname{Arccsc}(x) = \csc^{-1}(x) = \sin^{-1}\left(\frac{1}{x}\right) \text{ if } |x| \geq 1$$

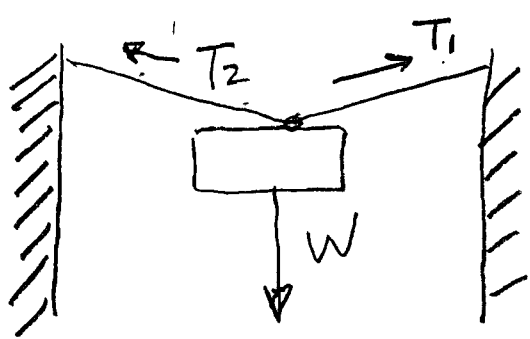
QUAD. III/IV } Range $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}, y \neq 0$

Domain

* see NOTE AT bottom of pg 159!

Review for Quiz 4

EX 2
Pg 233



$T_1 (400, 45^\circ)$
 $W \Rightarrow 800 \text{ lbs}$
 $T_2 = ?$

$$T_1 + T_2 + W = 0 \quad (800, 270^\circ)$$

$$T_2 = -W + -T_1 \quad \begin{matrix} -W (800, 90^\circ) \\ -T_1 (400, 225^\circ) \end{matrix}$$

$$-W_x \Rightarrow 800 \cos 90^\circ = 0$$

$$-T_{1x} \Rightarrow 400 \cos 225^\circ = -282.843$$

$$T_{2x} = -282.843$$

$$-W_y \Rightarrow 800 \sin 90^\circ = 800$$

$$-T_{1y} \Rightarrow 400 \sin 225^\circ = -282.843$$

$$T_{2y} = 517.157$$

Q II $T_2 (-282.843, 517.157)$

$$|T_2| = \sqrt{(-282.843)^2 + (517.157)^2} = 589.450$$

$$\theta' = \tan^{-1} \left(\frac{517.157}{282.843} \right) = 61.325^\circ \therefore \theta = 118.675^\circ$$

$$\boxed{T_2 = (589.5, 118.7^\circ)}$$

75
pg 251

$(0.5 - 1.2i)^8$ De Moivre's

Change to polar

$$|r| = \sqrt{(0.5)^2 + (-1.2)^2} = 1.3$$

QIV $\theta' = \tan^{-1}\left(\frac{1.2}{0.5}\right) = 67.380^\circ$

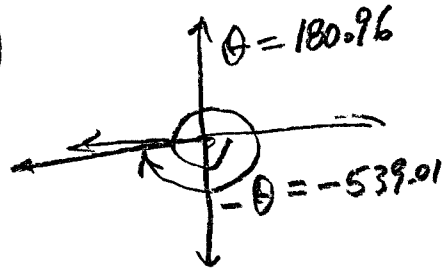
$$\therefore \theta = -67.380^\circ$$

$$\left[1.3 \operatorname{cis}(-67.380) \right]^8$$

$$= 1.3^8 \operatorname{cis}(8 \cdot (-67.380))$$

$$8.157 \operatorname{cis}(-539.04)$$

QIII $\Rightarrow 8.157 \operatorname{cis}(180.96)$



Back to rectangular

$$8.157 \cos(180.96) + 8.157 \sin(180.96) i$$

$$\boxed{-8.156 - 0.1367 i}$$