C11 - 2.3 - *Trig Ratios* Notes

Find $\sin x, \cos x,$ *and* $\tan x$ *for the following point. Find* θ_{stp}. SOH CAH TOA

$S \quad (-4,3)$

$\theta_{stp} = 143.1^o$

$\theta_r = 36.9^o$

180°

4

0°

T

C
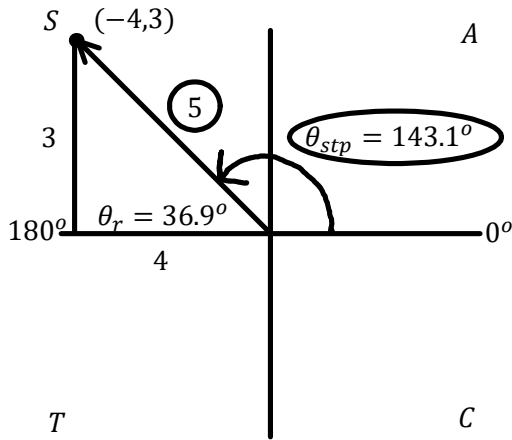
A

$a^2 + b^2 = c^2$

$3^2 + 4^2 = c^2$

$9 + 16 = c^2$

$25 = c^2$

$\sqrt{25} = \sqrt{c^2}$

$5 = c$

$\sin\theta = +\dfrac{3}{5}$

$\cos\theta = -\dfrac{4}{5}$

$\tan\theta = -\dfrac{3}{4}$

$\tan\theta = -\dfrac{3}{4}$

$\theta = \tan^{-1}(+0.75)$

$\theta = 36.9^o$

$180^o - 36.9^o = 143.1^o$

$\theta_{stp} = 143.1$

Check Answer

$\sin 143.1 = +0.6 = +\dfrac{3}{5}$ ✓

$\theta = \sin^{-1}(-\dfrac{3}{5})$
$\theta = 36.9$

$\theta = \cos^{-1}(-\dfrac{4}{5})$
$\theta = 143.1^o$

$\theta = \tan^{-1}(-\dfrac{3}{4})$
$\theta = -36.9^o$

$\theta = \sin^{-1}(+\dfrac{3}{5})$
$\theta = 36.9$

$\theta = \cos^{-1}(+\dfrac{4}{5})$
$\theta = 36.9^o$

$\theta = \tan^{-1}(+\dfrac{3}{4})$
$\theta = 36.9^o$

$\sin\theta = 0.8$

Solve for $\theta, 0^o \le \theta < 360^o$ **and general solution**

S $\quad$ y $\quad$ A

1 $\quad$ 1

0.8 $\quad$ 0.8

53.1^o $\quad$ 53.1^o

180° $\quad$ 0°

T $\quad$ C

$\sin\theta = \dfrac{0.8}{1}$

$\theta_r = \sin^{-1}\left(+\dfrac{0.8}{1}\right)$

$\theta_r = 53.1^o$

$\theta_{stp} = 53.1^o \quad \theta_{stp} = 180^o - 53.1^o$
$= 126.9^o$

$\theta_{stp} = 53.1^o, 126.9^o$

$\sin\theta = \dfrac{0.8}{1} = \dfrac{8}{10} = \dfrac{4}{5}$ $\quad$ θ *is the same!*

1 $\quad$ 0.8 $\quad$ θ

10 $\quad$ 8 $\quad$ θ

5 $\quad$ 4 $\quad$ θ
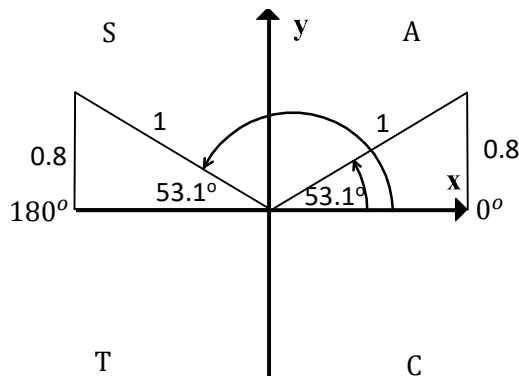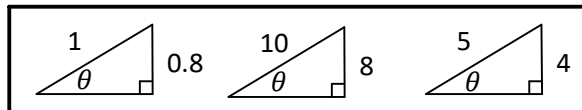
Draw two $\Delta's$ where $\sin\theta$ is positive: ASTC Quadrant I, II

Label the triangles according to SOH CAH TOA

Solve for θ_r: $\quad$ $\theta_r = \sin^{-1}(+\dfrac{O}{H})$

Draw an arrow from the principal axis:
To the first and second terminal arm

Solve for the arrows θ_{stp} $\quad$ $\sin 53.1^o = 0.8$ ✓

Check your answer: $\quad$ $\sin 126.9^o = 0.8$ ✓

General Solution:
$\theta = \theta_{stp} \pm pn, n \in I$

$\theta = 53.1^o \pm 360^o\, n, n \in I$
$\theta = 126.9^o \pm 360^o n, n \in I$