C11 - 2.5 - $sin\theta = \frac{1}{2}$ Notes
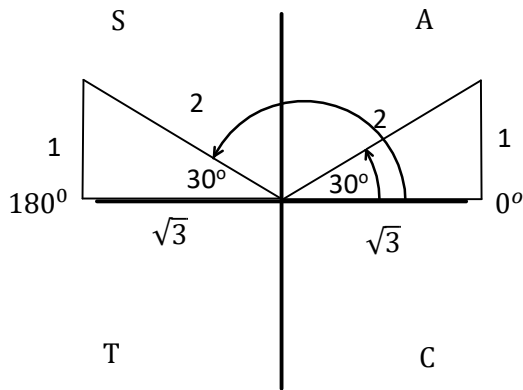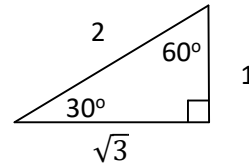
$sin\theta = \frac{1}{2}$ **Solve for θ, $0^o \leq \theta < 360^o$.**

Between 0 and 360 degrees

S   A

Draw Two $\Delta's$ where $sin\,\theta$ is +ve: ASTC Quadrant I, II

Label the $\Delta's$ according to SOH CAH TOA
Label the reference angle according to special $\Delta's$.

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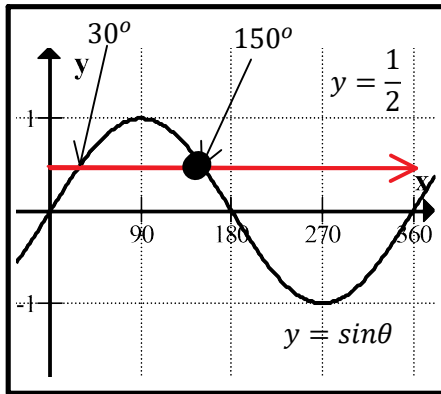To the first terminal arm and the second terminal arm.

Solve for the arrows θ_{stp}

Check on Calculator

$\theta_{stp} = 30^o$ $\theta_{stp} = 180^o - 30^o$
                   $= 150^o$

$\boxed{\theta_{stp} = 30^o, 150^o}$

Check your answer: $sin30^o = \frac{1}{2}$ ✓

$sin\theta = \frac{1}{2}$ $sin150^o = \frac{1}{2}$ ✓

$y = \frac{1}{2}$

$y = sin\theta$

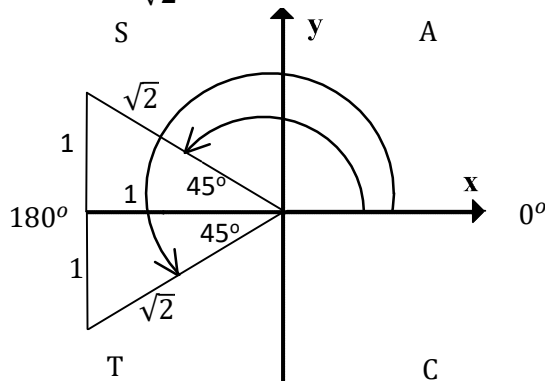Graphing Calculator
$y = sinx$
$y = \frac{1}{2}$

Zoom 7:
$-360 \leq x \leq 360$
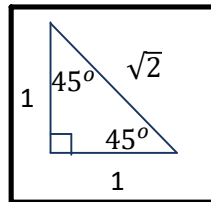Window = Domain
Find Intersections

$cos\theta = -\frac{1}{\sqrt{2}}$ **Solve for θ, $0^o \leq \theta < 360^o$ and general solution.**

S   y   A

Draw two triangles where $cos\,\theta$ is -ve...

T   C

$\theta_{stp} = 180^o + 45^o$ $\theta_{stp} = 180^o - 45^o$ $cos\theta = -\frac{1}{\sqrt{2}} = -0.707$
    $= 225^o$ $= 135^o$

$\boxed{\theta_{stp} = 225^o, 135^o}$ $cos135 = -\frac{1}{\sqrt{2}}$ ✓ $cos225 = -\frac{1}{\sqrt{2}}$ ✓

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

$\boxed{\theta = 225^o \pm 360^o n, n \in I}$

$\boxed{\theta = 135^o \pm 360^o n, n \in I}$

-0.707

135   225   495   585