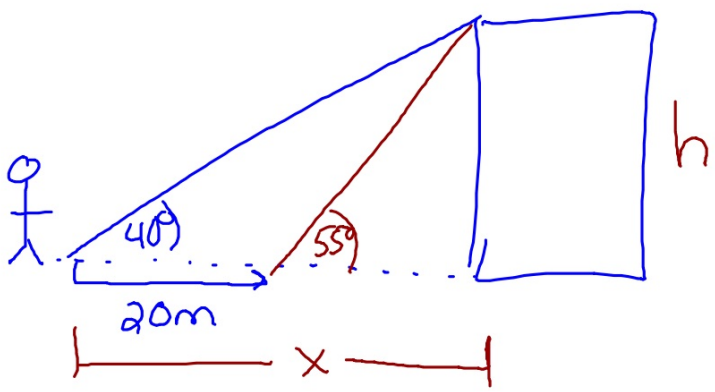
#10



48.5

$\tan 40 = \frac{h}{x}$

$x \tan 40 = h$

$x = \frac{h}{\tan 40}$

$\tan 55 = \frac{h}{x-20}$

$(x-20)\tan 55 = h$

$x\tan 55 - 20\tan 55 = h$

$x\tan 55 = h + 20\tan 55$

$x = \frac{h + 20\tan 55}{\tan 55}$

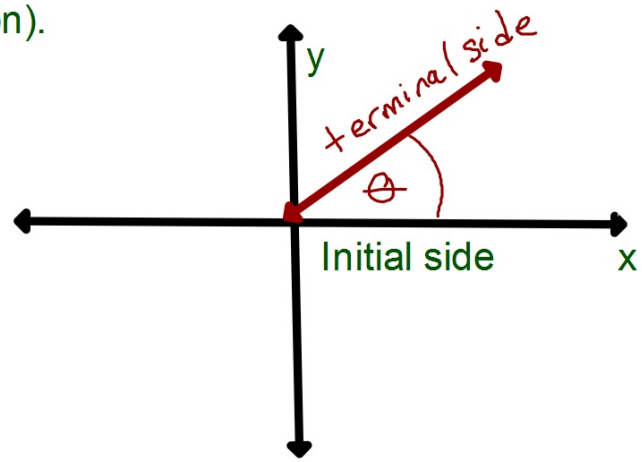
$x = \frac{h}{\tan 55} + 20$

$\frac{h}{\tan 40} = \frac{h}{\tan 55} + 20$

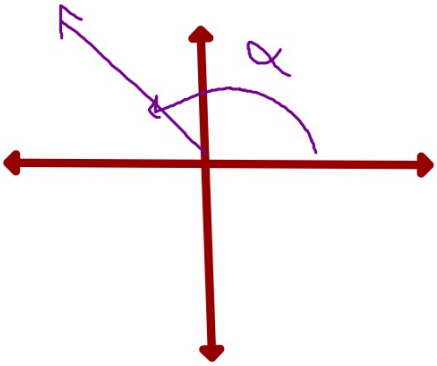
$h = \frac{h\tan 40}{\tan 55} + 20\tan 40$

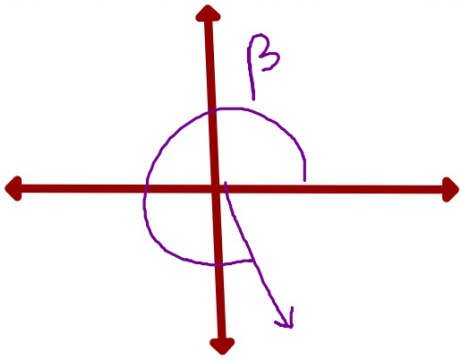
11.3 Using the coordinate axes in trigonometry

θ = angle on the coordinate axes who vertex is on the origin (Standard Position).



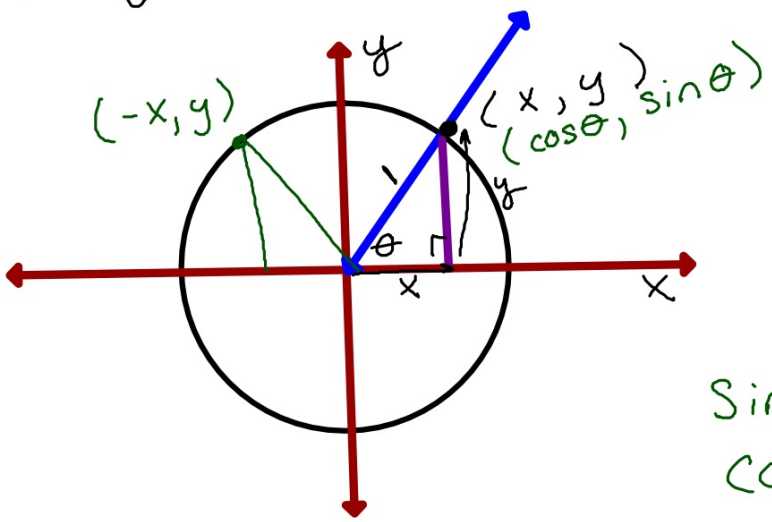
A positive angle is measured counterclockwise from the x-axis

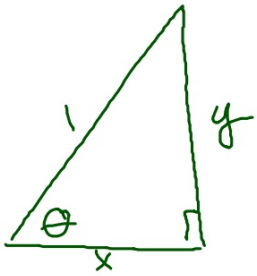




Unit Circle

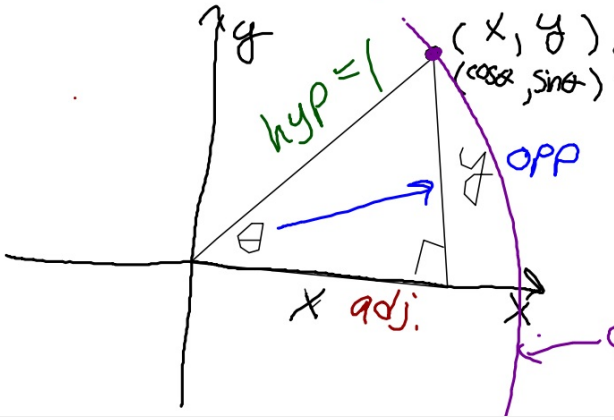
$x^2 + y^2 = 1$ Circle with radius 1





$\sin\theta = \frac{y}{1} = y$

$\cos\theta = \frac{x}{1} = x$

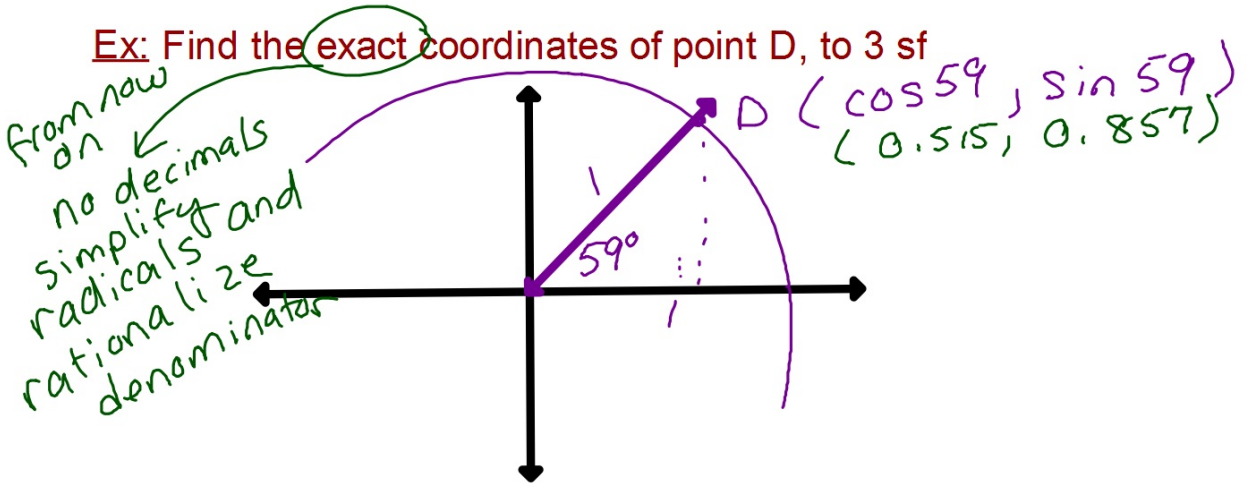


$\sin\theta = \frac{opp}{hyp} = \frac{y}{r} = y$

$\cos\theta = \frac{adj}{hyp} = \frac{x}{r} = x$

$\tan\theta = \frac{opp}{adj} = \frac{y}{x}$ $\frac{y}{x}$

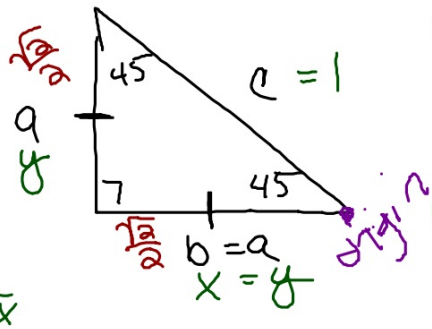
Ex: Find the exact coordinates of point D, to 3 sf



from now on
no decimals
simplify radicals and
rationalize denominators

- Side Trip: Special right triangles
  - 30°-60°-90°
  - 45°-45°-90°

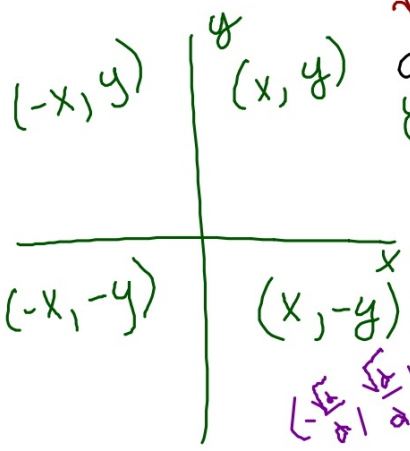
Recall: 45-45-90



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

$2a^2 = c^2$

$a^2 = \frac{1}{2}c^2$



unit circle

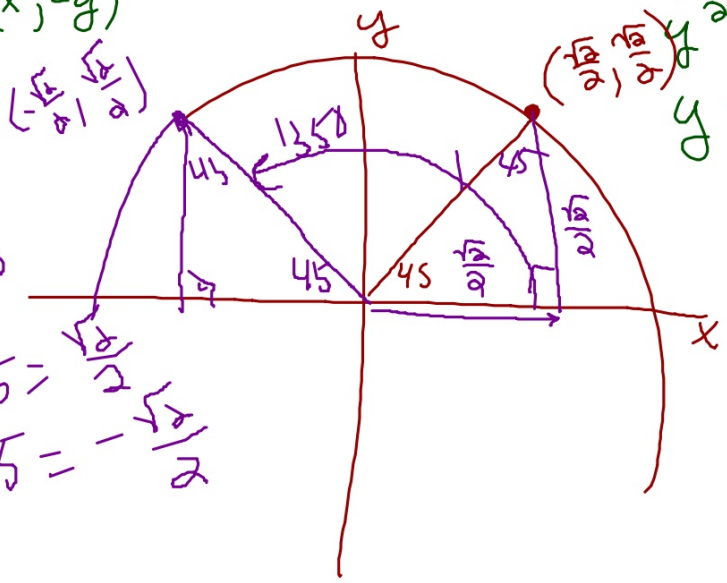
$x^2 + y^2 = 1^2$

$2y^2 = 1$

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

$y = \pm\frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

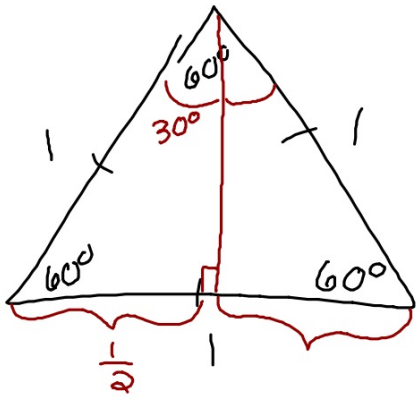
$= \frac{\sqrt{2}}{2}$



$\sin 135 = \frac{\sqrt{2}}{2}$

$\cos 135 = -\frac{\sqrt{2}}{2}$

Special Triangle : Equilateral



$\sin 30° = \frac{1}{2}$

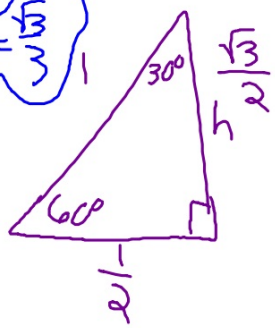
$\cos 30° = \frac{\sqrt{3}}{2}$

$\tan 30° = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

$\sin 60° = \frac{\sqrt{3}}{2}$

$\cos 60° = \frac{1}{2}$

$\tan 60° = \sqrt{3}$



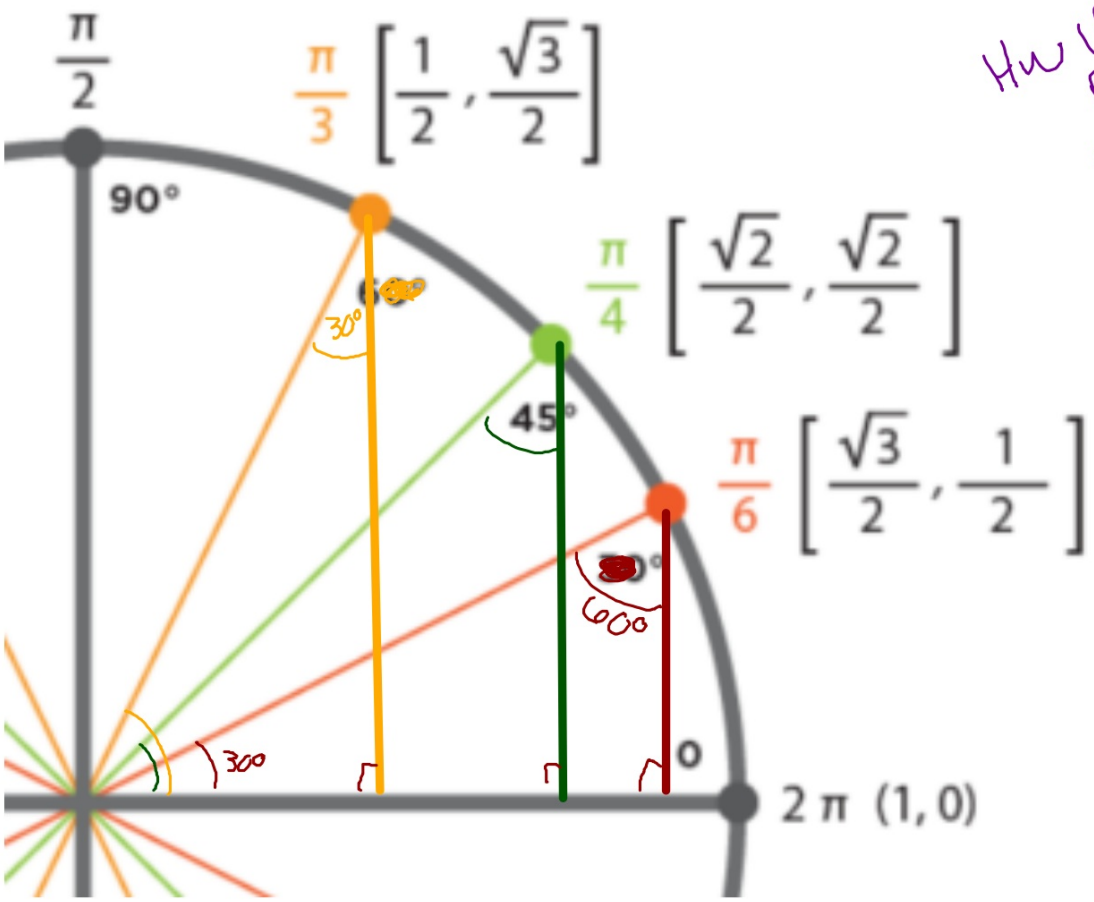
$\left(\frac{1}{2}\right)^2 + h^2 = 1^2$

$\frac{1}{4} + h^2 = 1$

$h^2 = 1 - \frac{1}{4}$

$h^2 = \frac{3}{4}$

$h = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{\sqrt{4}} = \pm\frac{\sqrt{3}}{2}$



Hw IID
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