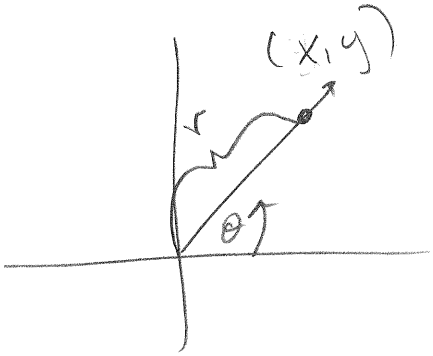
9/10/2012 Sec 1.4 (cont.) Sec 1.5 Math 1060

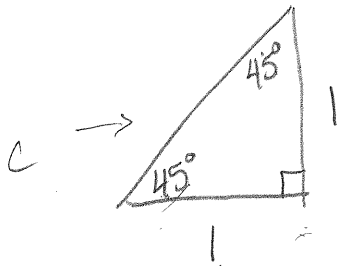
Reminder



$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ $\tan\theta = \frac{y}{x}$

$\csc\theta = \frac{r}{y}$ $\sec\theta = \frac{r}{x}$ $\cot\theta = \frac{x}{y}$

45° - 45° - 90° Triangle

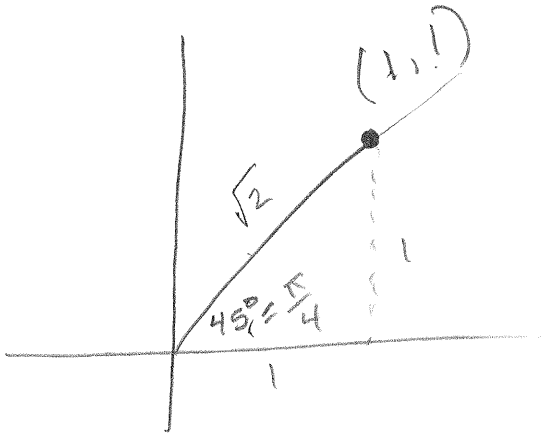


$c^2 = 1^2 + 1^2$

$c^2 = 1 + 1$

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

$c = \sqrt{2}$

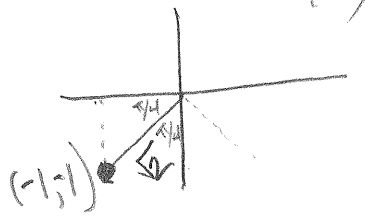


$\sin 45° = \frac{1}{\sqrt{2}} = \frac{1\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{\sqrt{2}}{2}$ $\cos 45° = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\csc 45° = \frac{\sqrt{2}}{1} = \sqrt{2}$ $\sec 45° = \sqrt{2}$

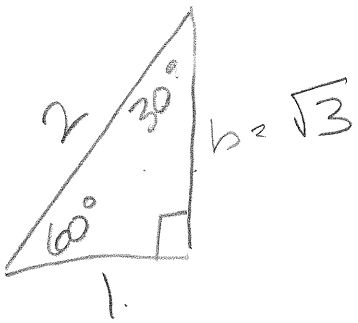
$\tan 45° = 1$ $\cot 45° = 1$

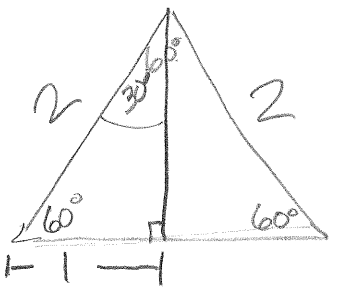
Find $\sin\left(-\frac{3\pi}{4}\right) = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$

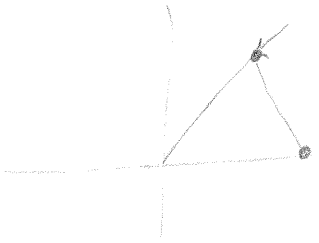


$\tan\left(-\frac{3\pi}{4}\right) = \frac{-1}{-1} = 1$

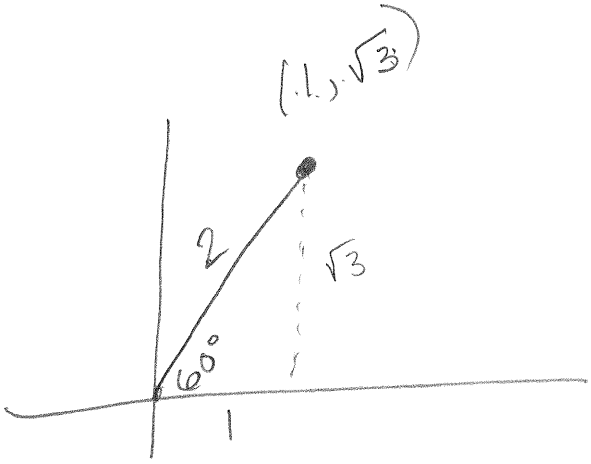
$30^\circ - 60^\circ - 90^\circ$



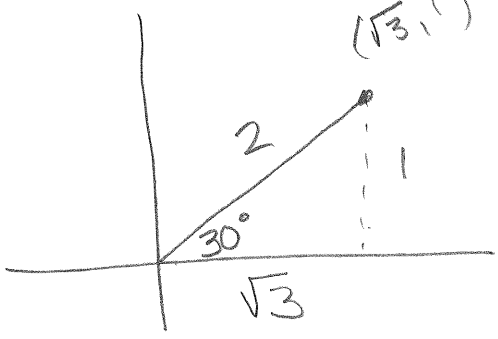




$$a^2 + b^2 = c^2$$
$$1^2 + b^2 = 2^2$$
$$1 + b^2 = 4$$
$$-1 \qquad -1$$
$$\sqrt{b^2} = \sqrt{3}$$
$$b = \sqrt{3}$$



$$\sin 60^\circ = \frac{\sqrt{3}}{2}$$
$$\cos 60^\circ = \frac{1}{2}$$
$$\tan 60^\circ = \frac{\sqrt{3}}{1} = \sqrt{3}$$



$$\sin 30^\circ = \frac{1}{2}$$
$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$
$$\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

Common Angles: 30, 45, 60

$\sin 0^\circ = 0 = \frac{\sqrt{0}}{2}$ $\quad \cos 0^\circ = 1 = \frac{\sqrt{4}}{2}$

$\sin 30^\circ = \frac{1}{2} = \frac{\sqrt{1}}{2}$ $\quad \cos 30^\circ = \sqrt{3}/2 = \frac{\sqrt{3}}{2}$

$\sin 45^\circ = \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2}$ $\quad \cos 45^\circ = \sqrt{2}/2 = \frac{\sqrt{2}}{2}$

$\sin 60^\circ = \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$ $\quad \cos 60^\circ = 1/2 = \frac{\sqrt{1}}{2}$

$\sin 90^\circ = 1 = \frac{\sqrt{4}}{2}$ $\quad \cos 90^\circ = 0 = \frac{\sqrt{0}}{2}$

$\sin(15)^\circ = .2588$

$\sec(\pi/5) = \frac{1}{\cos(\pi/5)} = 1.2361$

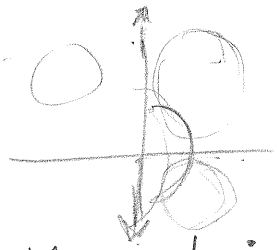
$\sec(x) \neq \cos^{-1}(x)$ $\quad \frac{1}{\cos(x)}$

Sec 1.5

Inverse Trig Functions

$\sin^{-1}(x)$, $\cos^{-1}(x)$, $\tan^{-1}(x)$

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



$\sin^{-1}(x) = \theta$ provided $\sin\theta = x$ and $-90^\circ \le \theta \le 90^\circ$
Quad I, IV

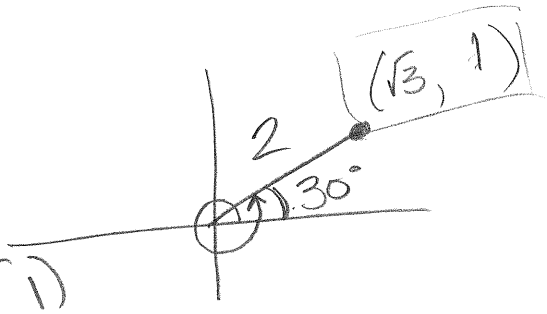
$\cos^{-1}(x) = \theta$ provided $\cos\theta = x$ and $0^\circ \le \theta \le 180^\circ$
Quad I, II

$\tan^{-1}(x) = \theta$ provided $\tan\theta = x$ and $-90^\circ < \theta < 90^\circ$
Quad I, IV

trig functions take angle give ratio

inverse trig functions take ratio give angle

Let $\sin\alpha = \frac{1}{2}$ ← y, ← r



$\alpha = 30^\circ + 360^\circ K$

$150^\circ + 360^\circ K$

$\alpha = 30^\circ + 360^\circ K \;,\; 150^\circ + 360^\circ K$

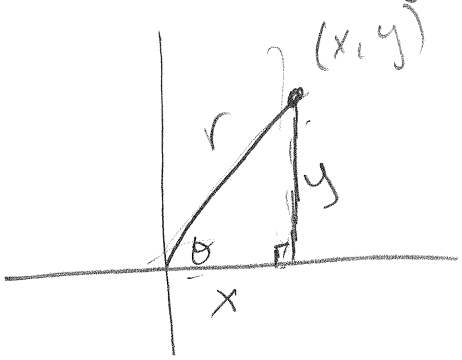
$\cos^{-1}\left(\frac{1}{2}\right) = 60^\circ$

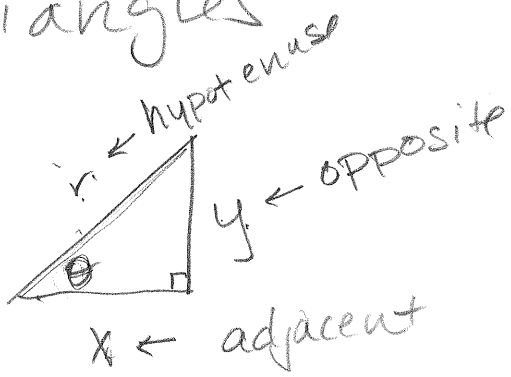
1
$\sqrt{3}$
$\sqrt{2}$
60° $\sqrt{1}$

$\sin^{-1}\left(\frac{2}{3}\right) = 41.8103$

in degrees

Trig w/ Right Triangles





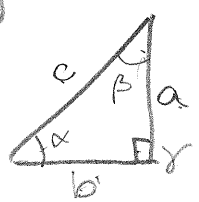
★ $\sin\theta = \frac{\text{OPP}}{\text{hyp}}$ $\cos\theta = \frac{\text{adj}}{\text{hyp}}$ $\tan\theta = \frac{\text{OPP}}{\text{adj}}$

$\csc\theta = \frac{\text{hyp}}{\text{OPP}}$ $\sec\theta = \frac{\text{hyp}}{\text{adj}}$ $\cot\theta = \frac{\text{adj}}{\text{OPP}}$

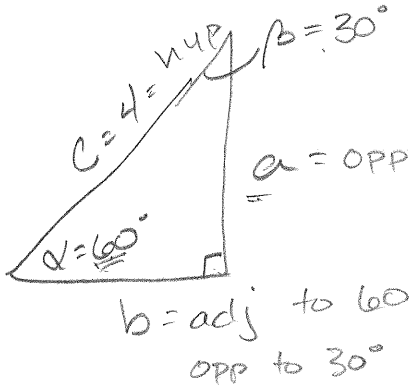
SOH CAH TOA

Some old horse Caught another horse taking oats away

Solve a Right Triangle = Find all unknown parts



Solve Right triangle where $\alpha = 60°$ $c = 4$



$60° + \beta + 90° = 180°$

$\beta + 150° = 180°$

$-150 \quad -150$

$\beta = 30°$

$\sin \alpha = \frac{OPP}{HYP}$

$a = 2\sqrt{3}$

$\sin 60° = \frac{a}{4}$

$b = 2$

$4 \cdot \frac{\sqrt{3}}{2} = \frac{a}{4} \cdot 4$

$2 \quad 2$

$\frac{4\sqrt{3}}{2} = \frac{2a}{2}$

$2\sqrt{3} = a$