

MAT 122

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① Two angles with the same initial and terminal sides are coterminal

⋮

#s 15-18 Determine the complement and supplement of each angle.

↓

$$A+B = \frac{\pi}{2} = 90^\circ$$

↓

$$A+B = 180^\circ = \pi$$

$\nexists A > 0, B > 0$

$\nexists A > 0, B > 0$
 $A, B > 0$

and both are positive.

Three plus two equals five

$$3+2=5$$

$$\theta = \frac{\pi}{4} \Rightarrow \theta_c = \frac{\pi}{2} - \frac{\pi}{4} = \frac{2\pi - \pi}{4} = \frac{\pi}{4} = 45^\circ$$

$$\theta_s = \pi - \frac{\pi}{4} = \frac{(4-1)\pi}{4} = \frac{3\pi}{4} = 135^\circ$$

$$\frac{3\pi}{4} = \frac{180^\circ}{4} = 3 \cdot 45^\circ = 135^\circ$$

$$\begin{array}{r}
 45 \\
 \underline{45} \\
 90 \\
 \underline{45} \\
 135 \\
 \underline{45} \\
 180 \\
 \underline{45} \\
 225 \\
 \underline{45} \\
 270 \\
 \underline{45} \\
 315 \\
 \underline{45} \\
 360
 \end{array}$$

CHegg.com

eBay

Amazon

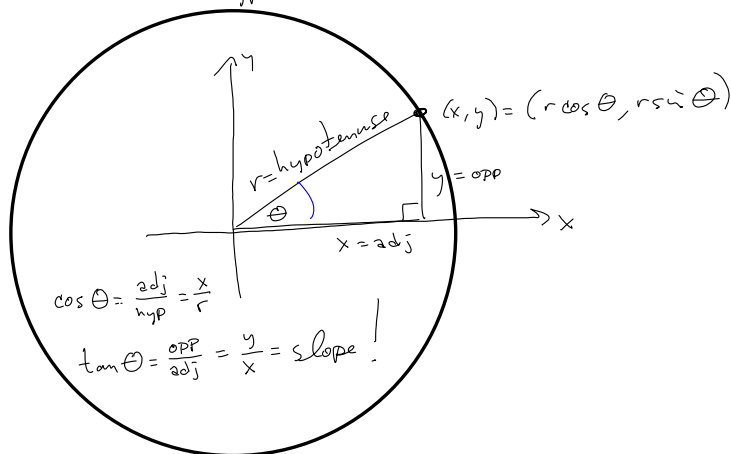
vitalsource.com

SKIP S'1.2. Then go back after working S'1.3.

SOHCAHTOA

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

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



So, since $\sin \theta = \frac{y}{r} \Rightarrow$

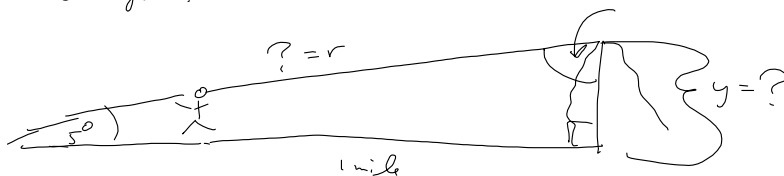
$$y = r \sin \theta$$

Also, $\cos \theta = \frac{x}{r} \Rightarrow x = r \cos \theta$

S'1.2: What if $r = 1$?

Then $(x, y) = (\cos \theta, \sin \theta)$

A man is a mile away from a hill. The angle he's looking up to the top of the hill is 5 degrees. How tall is the hill?



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

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

$$\tan 5^\circ = \frac{y}{1 \text{ mi}}$$

$$1 \tan 5^\circ = y$$

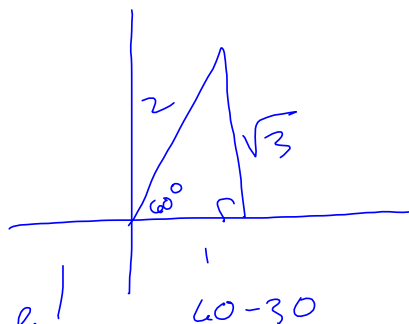
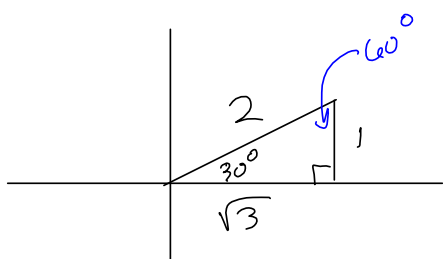
$$y = \tan(5^\circ)$$

$$\approx .087488664 \text{ mi}$$

$$= (.087488664) \left(\frac{5280 \text{ ft}}{1 \text{ mi}} \right)$$

$$\approx 461.9401434 \text{ ft}$$

$$\approx 462 \text{ ft to the nearest foot.}$$



30-60

Read it off the triangle!

$$\sin 30^\circ = \frac{1}{2}$$

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

$$\tan 30^\circ = \frac{1}{\sqrt{3}} \text{ is fine. Don't over-think.} \uparrow$$

Formally, we want denominators rationalized,

$$\text{so } \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

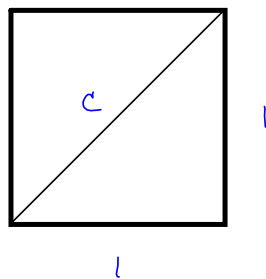
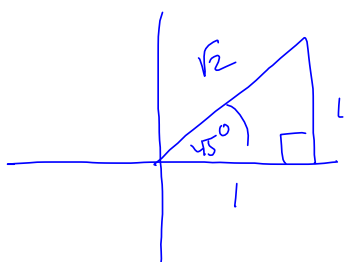
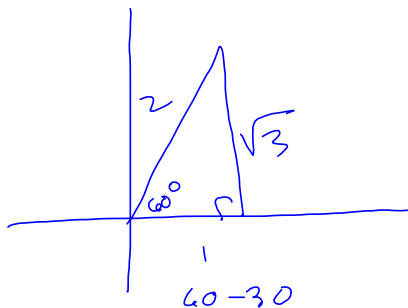
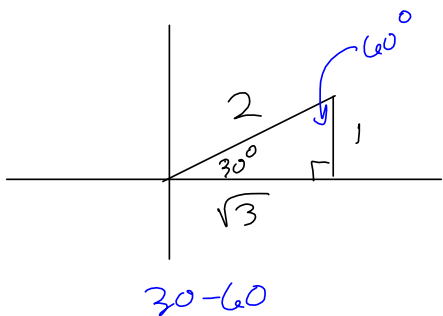
↑
irrational.

↑
Rational

Don't waste time rationalizing UNLESS
I specifically require it, with the phrase

"simplified radical form."

If I don't, you don't.



$$\sqrt{3^2} = \sqrt{9} = 3$$

$$\sqrt{(-3)^2} = \sqrt{9} = 3$$

$$|3| = 3$$

$$|-3| = 3$$

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

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

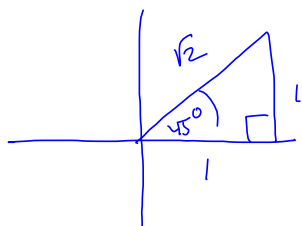
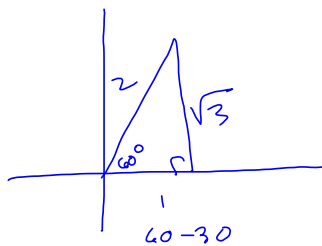
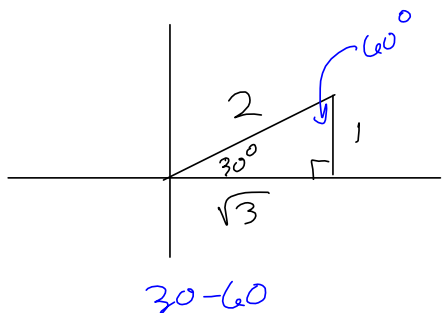
$$|c| = \sqrt{2}$$

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

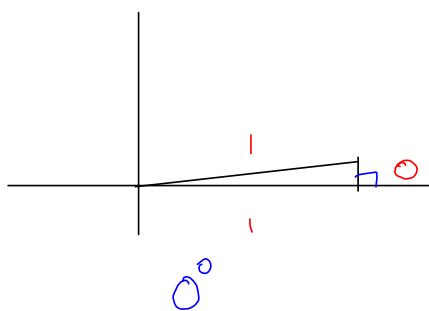
until chapter 6,
the hypotenuse is ALWAYS
POSITIVE, so

$$c = \sqrt{2}$$

(Always remember the \pm)



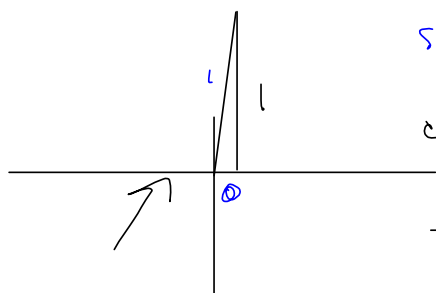
Degenerate Cases: 0° & 90°



$$\sin 0^\circ = \frac{0}{1} = 0$$

$$\cos 0^\circ = \frac{1}{1} = 1$$

$$\tan 0^\circ = \frac{0}{1} = 0$$



$$\sin 90^\circ = \frac{1}{1} = 1$$

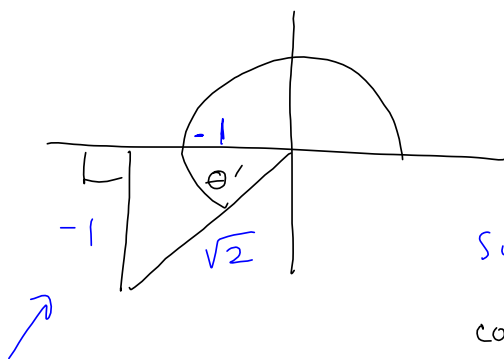
$$\cos 90^\circ = \frac{0}{1} = 0$$

$$\tan 90^\circ = \frac{1}{0} = \text{DNE}$$

$$\theta = 225^\circ$$

$$\sin 225^\circ = ?$$

$$\theta' = 45^\circ$$



$$\sin 225^\circ = -\frac{1}{\sqrt{2}}$$

$$\cos 225^\circ = -\frac{1}{\sqrt{2}}$$

$$\tan 225^\circ = 1$$

