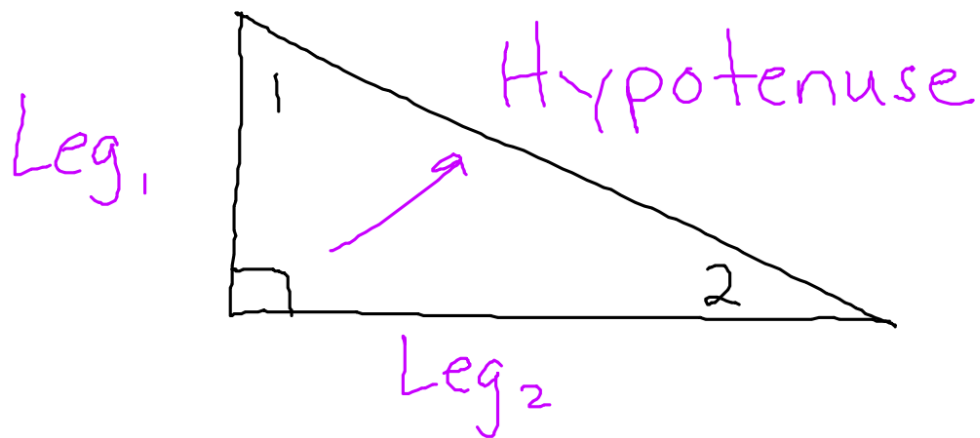


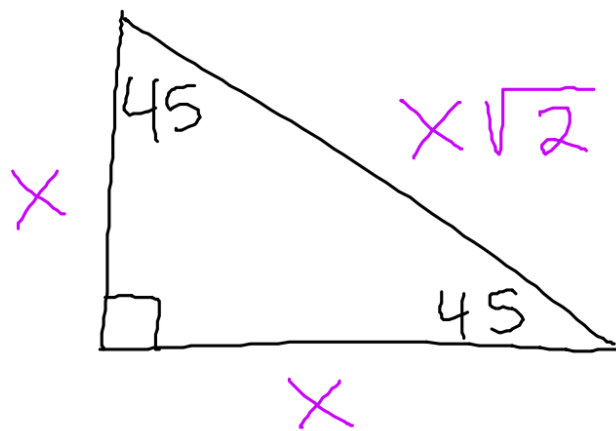
Geometry Review

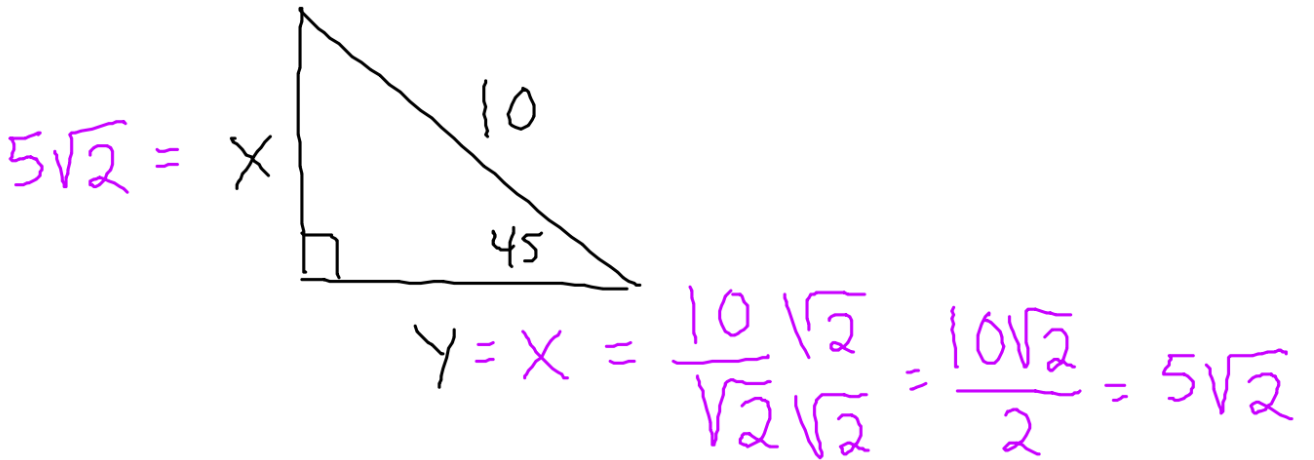
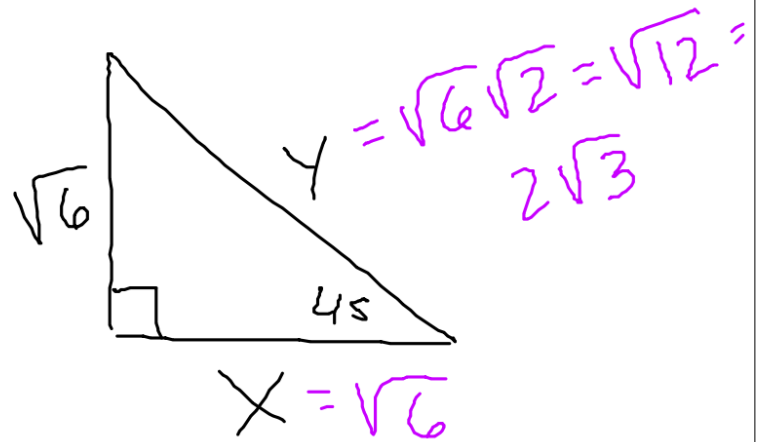
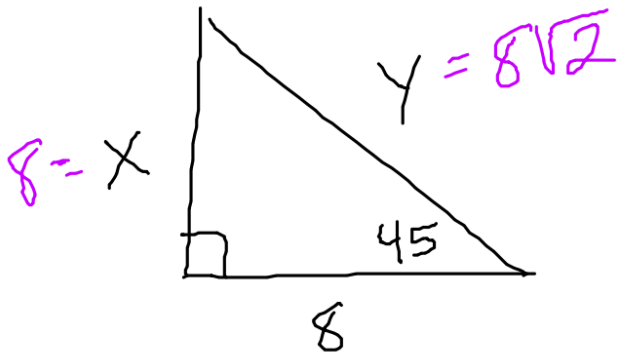
Right Triangles



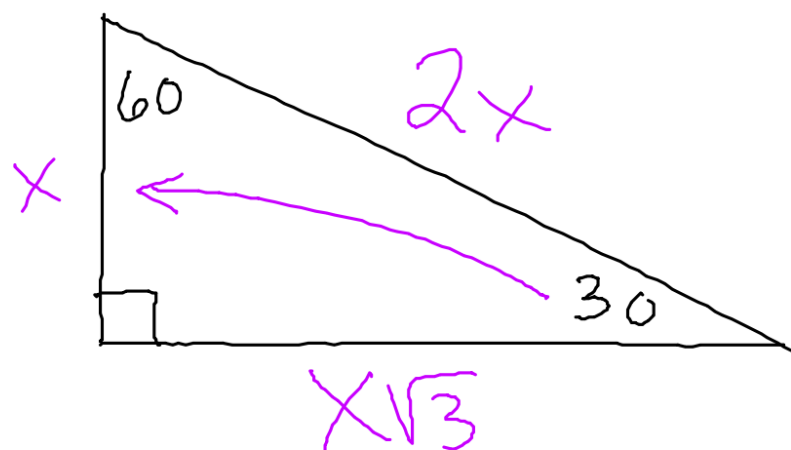
$$(\text{Leg}_1)^2 + (\text{Leg}_2)^2 = (\text{Hypotenuse})^2$$

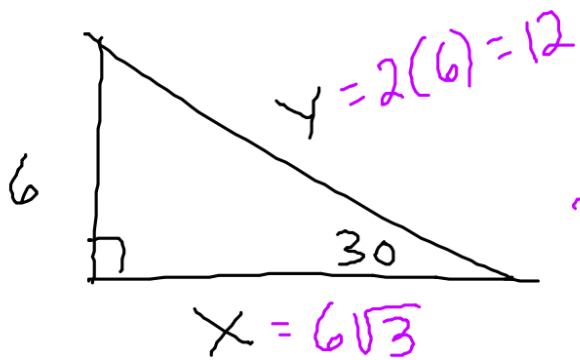
45-45-90



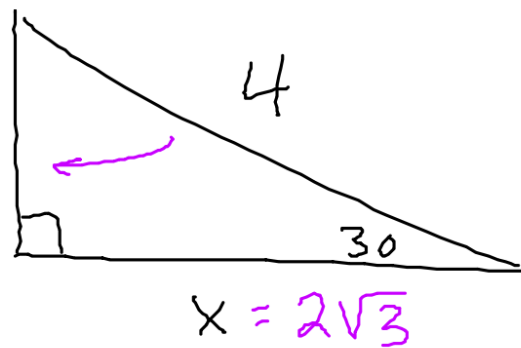


30-60-90

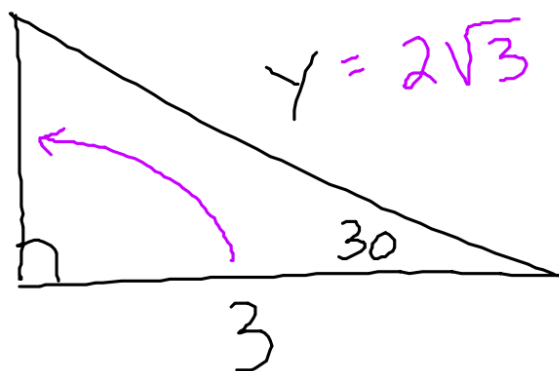




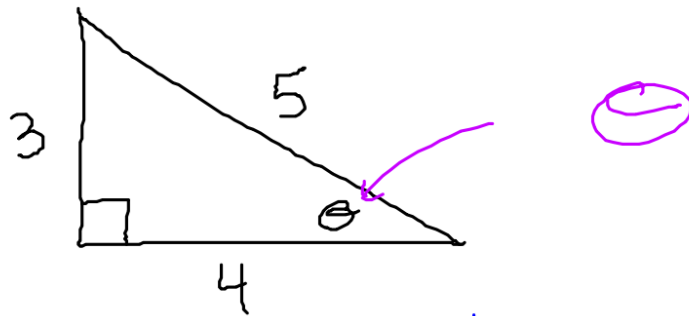
$$2 = \frac{4}{2} = y$$



$$\sqrt{3} = \frac{3}{\sqrt{3}} = x$$



Trigonometric Ratios

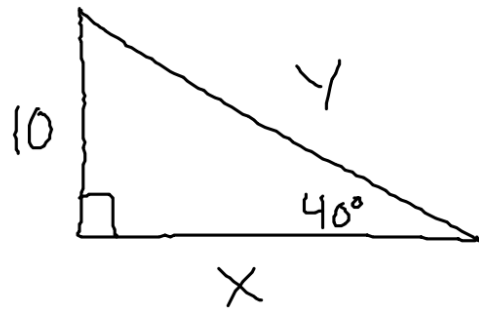


$$\text{Sine Ratio} = \sin \theta = \frac{\text{Opp Leg}}{\text{Hyp}} = \frac{3}{5}$$

$$\text{Cosine Ratio} = \cos \theta = \frac{\text{Adj Leg}}{\text{Hyp}} = \frac{4}{5}$$

$$\text{Tangent Ratio} = \tan \theta = \frac{\text{Opp Leg}}{\text{Adj Leg}} = \frac{3}{4}$$

SOH
CAH
TOA



$$\tan 40^\circ = \frac{10}{x}$$

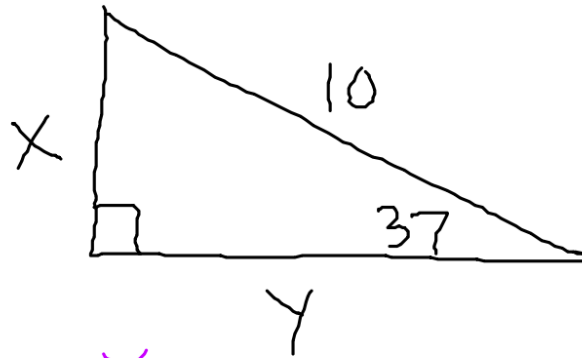
$$x(\tan 40) = 10$$

$$x = \frac{10}{\tan 40} \approx 11.92$$

$$\sin 40^\circ = \frac{10}{y}$$

$$y(\sin 40) = 10$$

$$y = \frac{10}{\sin 40} \approx 15.56$$



$$\sin 37^\circ = \frac{X}{10}$$

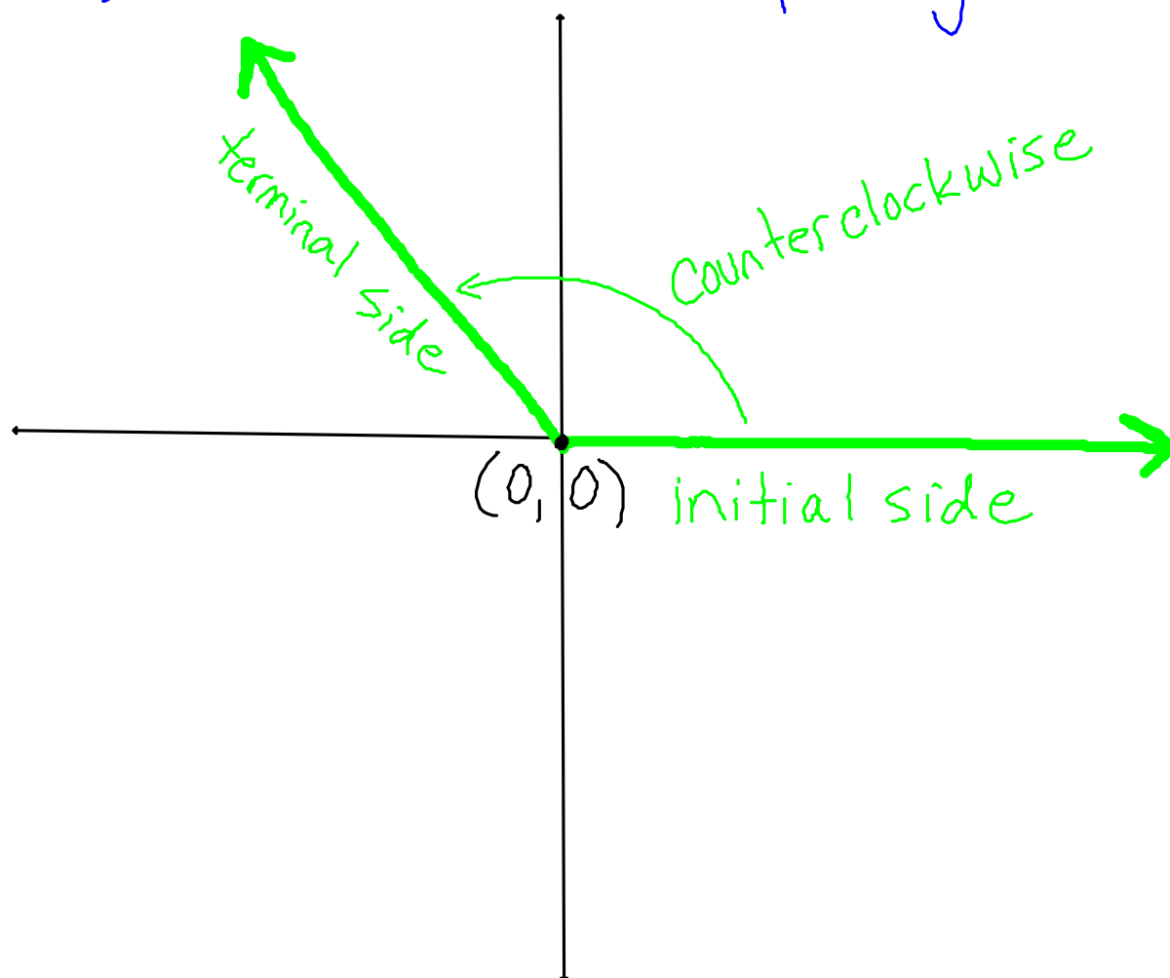
$$X = 10 (\sin 37) \approx 6.02$$

$$\cos 37 = \frac{Y}{10}$$

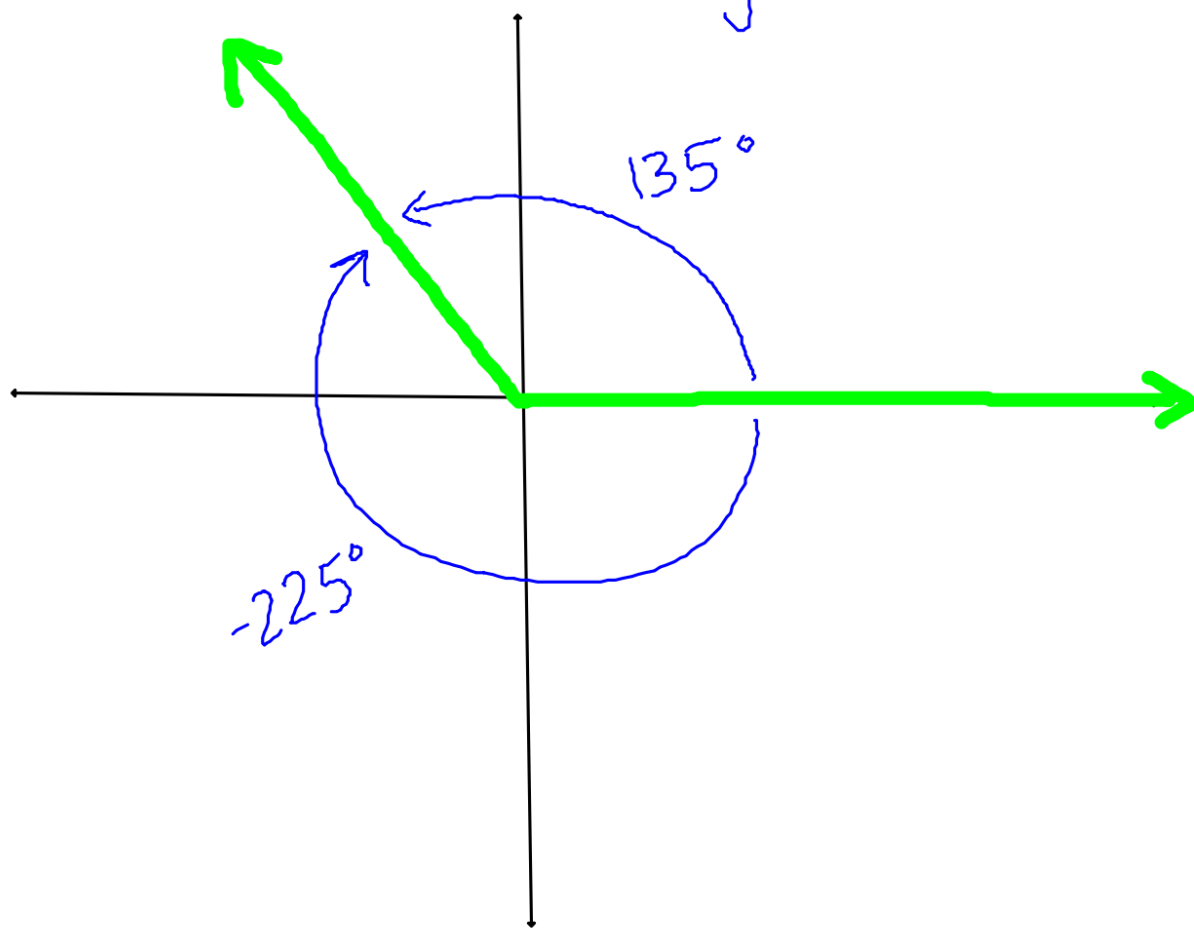
$$Y \approx 10 (\cos 37) \approx 7.99$$

Sec 13-2

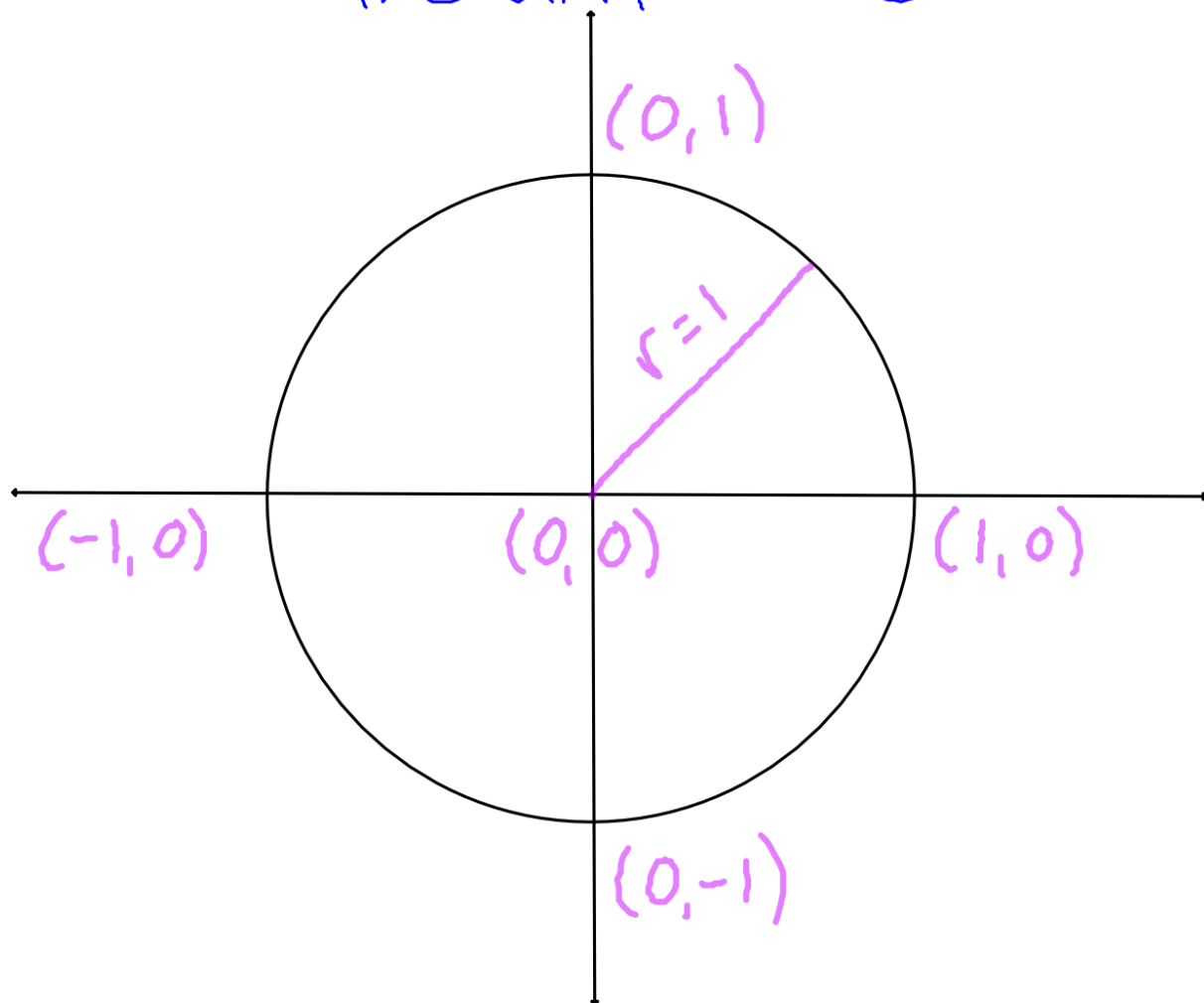
Standard Position of Angles



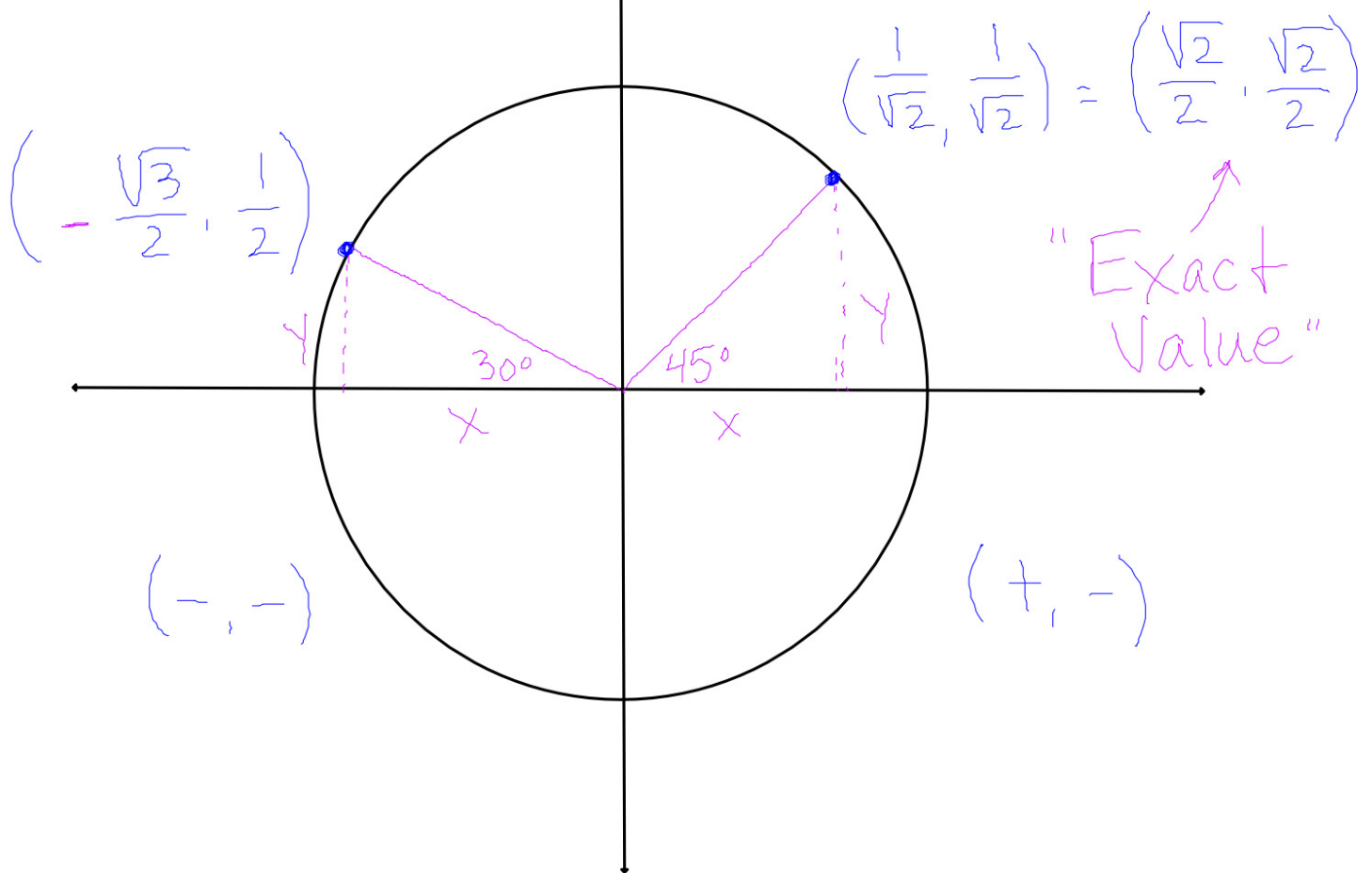
Coterminal Angles



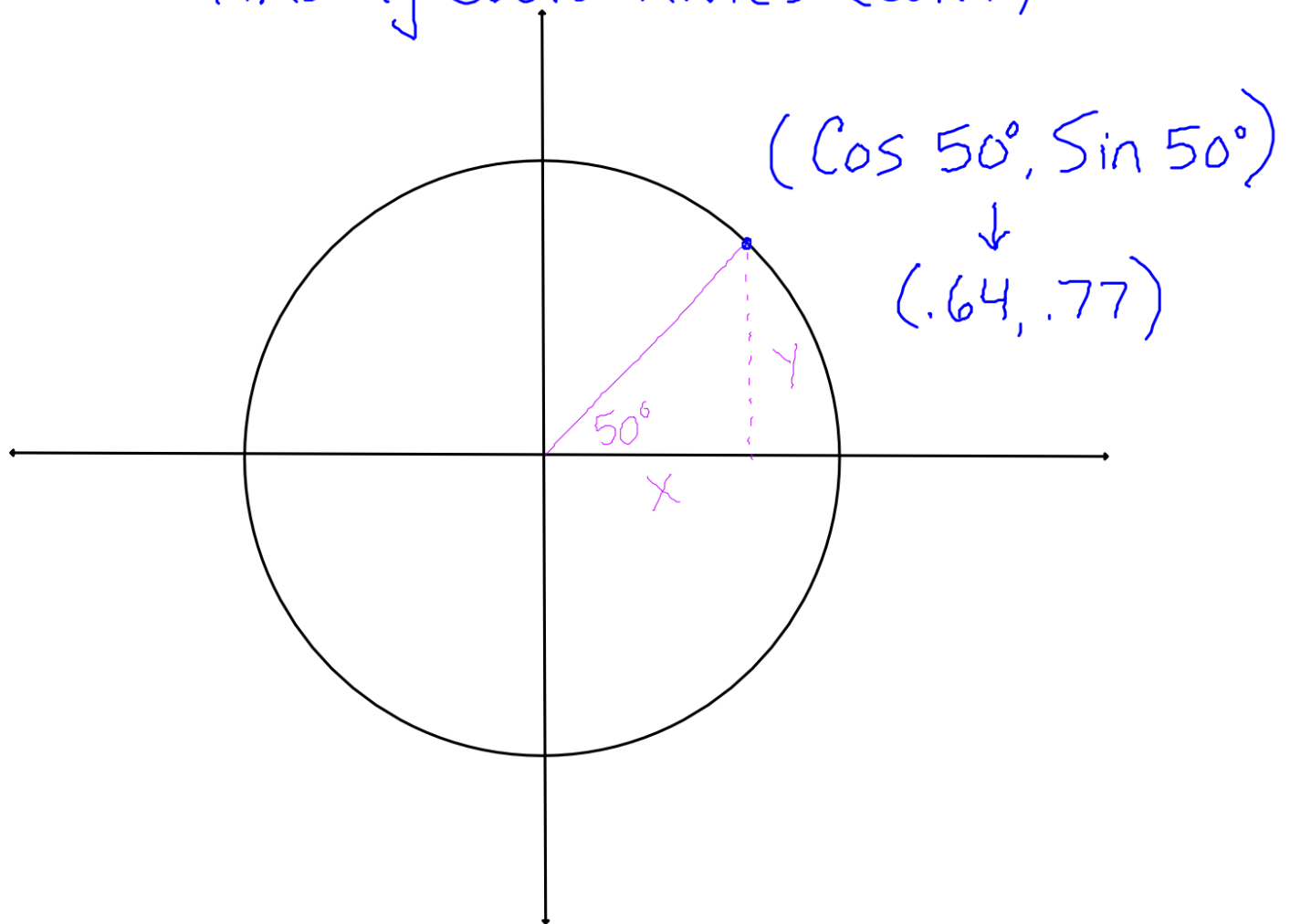
The Unit Circle



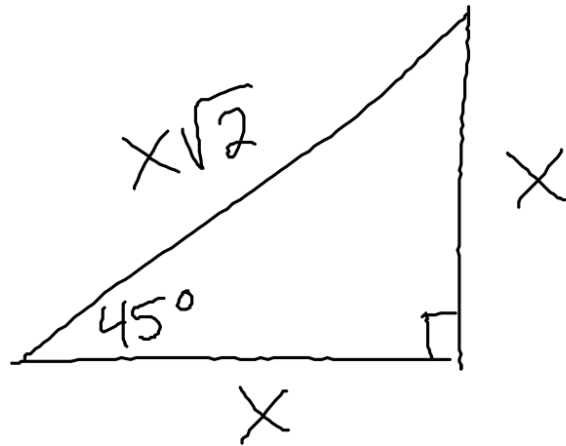
Finding Coordinates



Finding Coordinates (cont)



Sec 13-3



$$\tan 45^\circ = \frac{x}{x} = 1.0000$$

$$\sin 45^\circ = \frac{\cancel{x}}{x\sqrt{2}} = \frac{1}{\sqrt{2}} = .7071$$

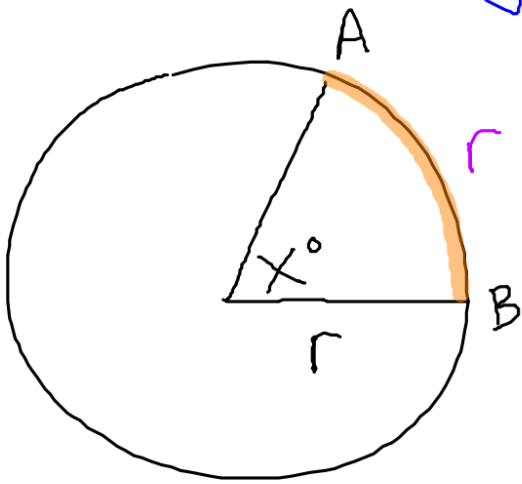
Degrees \rightarrow Radians

Purpose of Degrees / Radians

Measures the amount of rotation from the initial side to the terminal side



Arc Lengths



$$\widehat{AB} = \frac{x}{360} \cdot 2\pi r$$



$$\text{If } \widehat{AB} = r$$

then $x = 1 \text{ radian}$

Degrees

$$360^\circ$$

$$180^\circ$$

$$90^\circ$$

$$270^\circ$$

Radians

$$2\pi$$

$$\pi$$

$$\frac{\pi}{2}$$

$$\frac{3\pi}{2}$$

In General

$$\frac{n^{\circ}}{180} = \frac{r}{\pi}$$

Ex $27^\circ = \underline{\hspace{1cm}}$ radians

$$\frac{3}{20} \frac{\cancel{27}}{\cancel{180}} = \frac{r}{\pi}$$

$$20r = 3\pi$$

$$r = \frac{3\pi}{20}$$

Ex $\frac{3\pi}{4}$ radians = _____ degrees

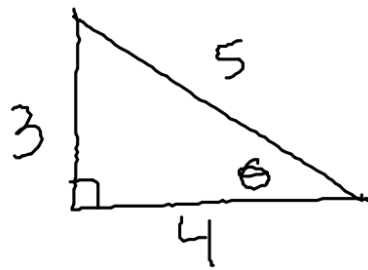
$$\frac{X}{180} = \frac{\frac{3\cancel{\pi}}{4}}{\cancel{\pi}}$$

$$X = \frac{3}{4}(180)$$

$$X = 135^\circ$$

Sec 14-1

Trigonometric Ratios



Sine Ratio

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{3}{5}$$

Cosine Ratio

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{4}{5}$$

Tangent Ratio

$$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{3}{4}$$

Cosecant Ratio

$$\csc \theta = \frac{\text{hyp}}{\text{opp}} = \frac{5}{3}$$

Secant Ratio

$$\sec \theta = \frac{\text{hyp}}{\text{adj}} = \frac{5}{4}$$

Cotangent Ratio

$$\cot \theta = \frac{\text{adj}}{\text{opp}} = \frac{4}{3}$$

Elementary Identities

$$1) \sin \theta \csc \theta = 1$$

$$2) \cos \theta \sec \theta = 1$$

$$3) \tan \theta \cot \theta = 1$$

Reciprocal
Identities

Note

If $\sin \theta \csc \theta = 1$ then $\sin \theta = \frac{1}{\csc \theta}$ etc

$$4) \tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\frac{\frac{3}{5}}{\frac{4}{5}} = \frac{3}{4}$$

$$5) \cot \theta = \frac{\cos \theta}{\sin \theta}$$

$$6) \cos^2 \theta + \sin^2 \theta = 1$$

$$\left(\frac{4}{5}\right)^2 + \left(\frac{3}{5}\right)^2 = \frac{16}{25} + \frac{9}{25} = \frac{25}{25} = 1$$

$$\left(\frac{\text{adj}}{\text{hyp}}\right)^2 + \left(\frac{\text{opp}}{\text{hyp}}\right)^2 = \frac{\text{adj}^2 + \text{opp}^2}{\text{hyp}^2} = 1$$

$$7) \sec^2 \theta = 1 + \tan^2 \theta$$

$$8) \csc^2 \theta = 1 + \cot^2 \theta$$

Establishing New Identities

- 1) Use elementary identities
- 2) Change everything to sin and cos
- 3) Don't Give Up ÷

Show $\frac{1}{3} + \frac{2}{5} = \frac{11}{15}$

$$\frac{1}{3} + \frac{2}{5} = \frac{1^{(5)}}{3^{(5)}} + \frac{2^{(3)}}{5^{(3)}} = \frac{5}{15} + \frac{6}{15} = \frac{5+6}{15} = \frac{11}{15} \checkmark$$

Show $\sec \theta \cdot \cot \theta = \csc \theta$

$$\sec \cdot \cot = \frac{1}{\cancel{\cos}} \cdot \frac{\overset{1}{\cancel{\cos}}}{\sin} = \frac{1}{\sin} = \csc \checkmark$$

Show $\sec \theta - \cos \theta = \tan \theta \cdot \sin \theta$

$$\sec - \cos = \frac{1}{\cos} - \frac{\overset{\text{cos}}{\cancel{\cos}}}{\underset{\text{cos}}{\cancel{1}}} = \frac{1}{\cos} - \frac{\cos^2}{\cos}$$

$$= \frac{1 - \cos^2}{\cos} = \frac{\sin^2}{\cos} = \frac{\sin}{\cos} \cdot \frac{\sin}{1}$$

$$= \tan \cdot \sin \checkmark$$