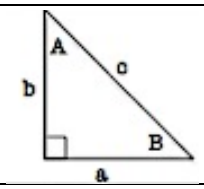
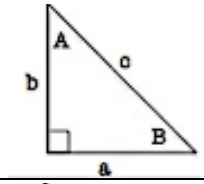
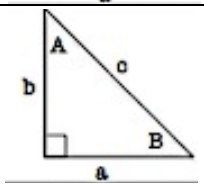
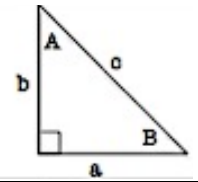
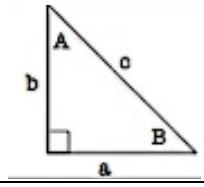
Solving Using Trigonometric Ratios { 9.4 }

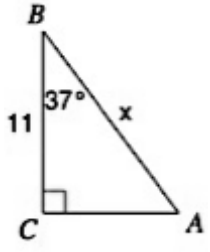
Secondary Math II Notes

OBJECTIVE: *Solve for missing angles and sides using trigonometric ratios.*

Solving Sides of Right Triangles

Solve for side a	Given Items	Method
Option #1	 Angle A Side c	$\sin(A)=\frac{a}{c}$ $c\cdot\sin(A)=a$
Option #2	 Angle A Side b	$\tan(A)=\frac{a}{b}$ $b\cdot\tan(a)=a$
Option #3	 Angle B Side c	$\cos(B)=\frac{a}{c}$ $c\cdot\cos(B)=a$
Option #4	 Angle B Side b	$\tan(B)=\frac{b}{a}$ $a=\frac{b}{\tan(B)}$
Option #5	 Side b Side c	$a^2+b^2=c^2$ $a^2=c^2-b^2$

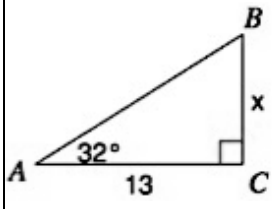
Solve for the missing side. Round answers to the nearest hundredth.



$\cos(37)=\frac{11}{x}$

$x=\frac{11}{\cos(37)}$

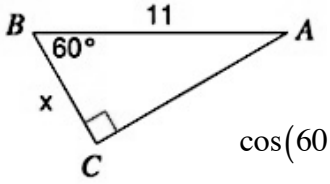
$x=13.77$



$\tan(32)=\frac{x}{13}$

$13\cdot\tan(32)=x$

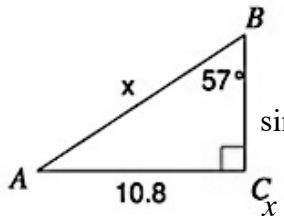
$x=8.12$



$\cos(60)=\frac{x}{11}$

$11\cdot\cos(60)=x$

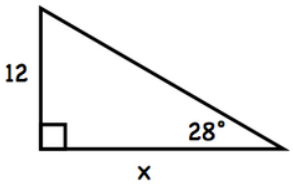
$x=5.5$



$\sin(57)=\frac{10.8}{x}$

$x=\frac{10.8}{\sin(57)}$

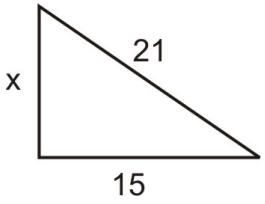
$x=12.88$



$\tan(28)=\frac{12}{x}$

$x=\frac{12}{\tan(28)}$

$x=22.57$



$x^2+15^2=21^2$

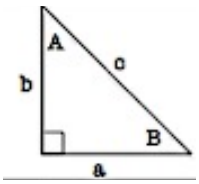
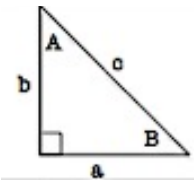
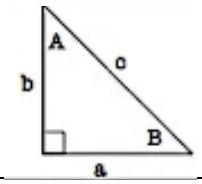
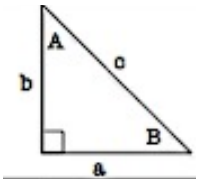
$x^2=21^2-15^2$

$x^2=216$

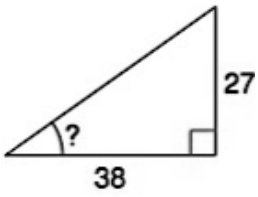
$x=6\sqrt{6}$

Solving Angles of Right Triangles

When solving for angle measurements we use inverse trig functions. $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$

Solving Angle A	Given Items	Method
Option #1	 Side a Side c	$\sin(A)=\frac{a}{c}$ $\sin^{-1}\left(\frac{a}{c}\right)=A$
Option #2	 Side b Side c	$\cos(A)=\frac{b}{c}$ $\cos^{-1}\left(\frac{b}{c}\right)=A$
Option #3	 Side a Side b	$\tan(A)=\frac{a}{b}$ $\tan^{-1}\left(\frac{a}{b}\right)=A$
Option #4	 Angle B	$A+B+C=180$ $C=90$ $A+B=90$ $A=90-B$

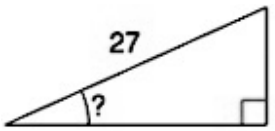
Solve for the missing angle. Round answers to the nearest hundredth.



$\tan(?)=\frac{27}{38}$

$\tan^{-1}\left(\frac{27}{38}\right)=?$

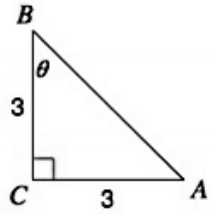
$?=35.39$



$\sin(?)=\frac{11}{27}$

$\sin^{-1}\left(\frac{11}{27}\right)=?$

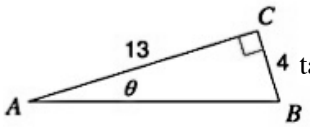
$?=25$



$\tan(\theta)=\frac{3}{3}$

$\tan^{-1}(1)=\theta$

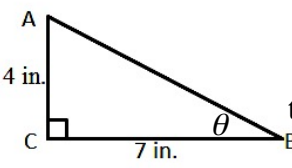
$\theta=45$



$\tan(\theta)=\frac{4}{13}$

$\tan^{-1}\left(\frac{4}{13}\right)=\theta$

$\theta=$

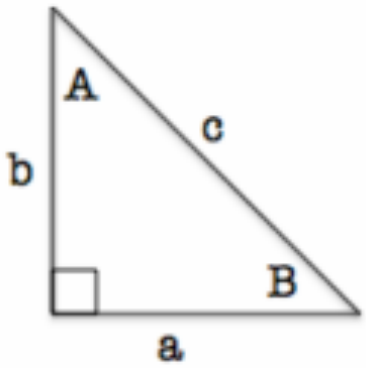


$\tan(\theta)=\frac{4}{7}$

$\tan^{-1}\left(\frac{4}{7}\right)=\theta$

$\theta=$

Use the figure below to find the missing items



$A=30°$

$B=$

$C=90°$

$a=5$

$b=$

$c=$

$30+B+90=180$

$B=60°$

$\sin(30)=\frac{5}{c}$

$c=\frac{5}{\sin(30)}=$

$\tan(30)=\frac{5}{b}$

$b=\frac{5}{\tan(30)}=$