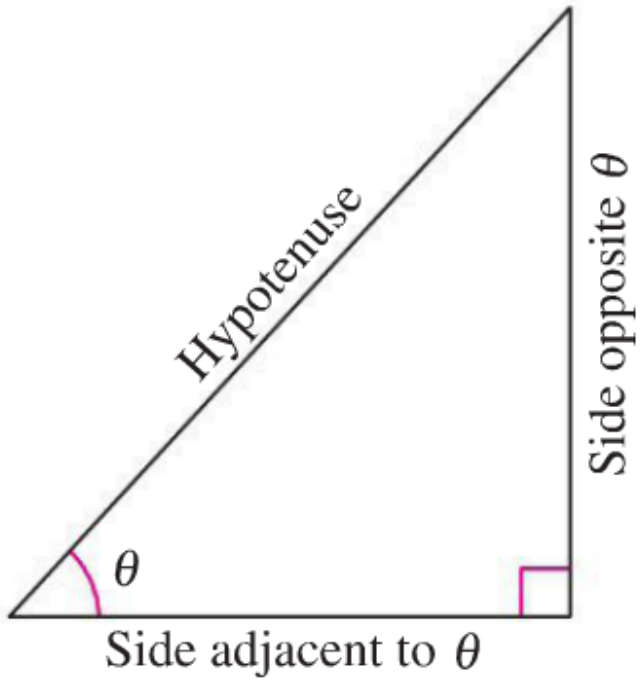
Right Triangle Trigonometry

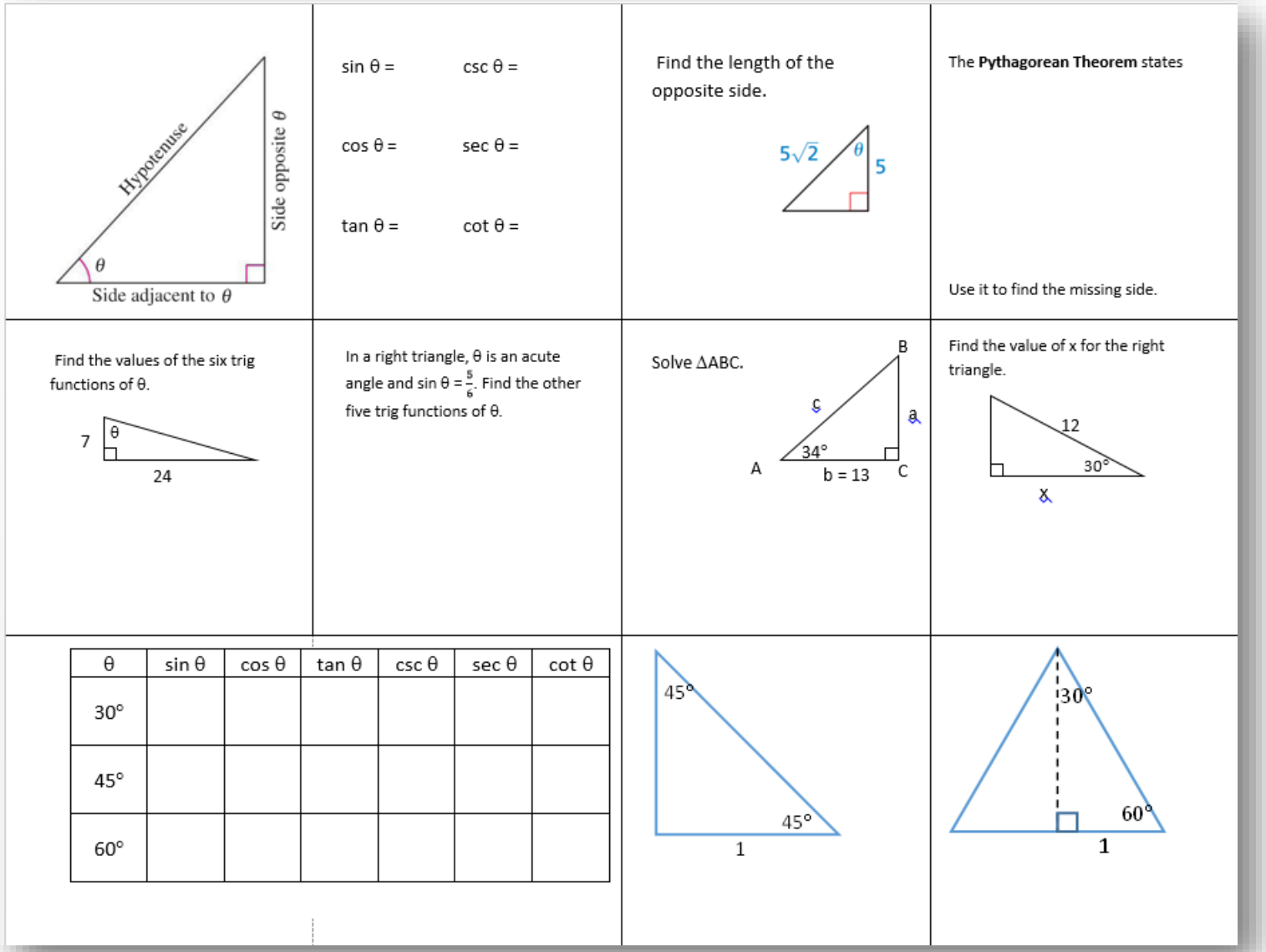
Lesson 9.1



Outside of Notes Sheet when Folded

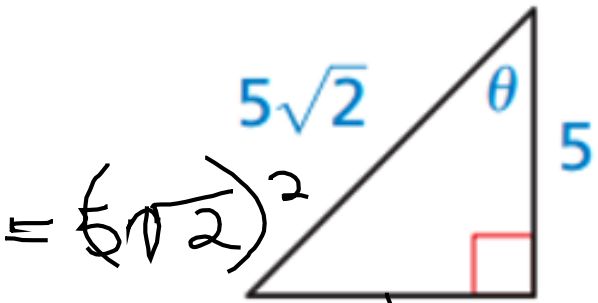
SOH-CAH-TOA Some Old Horse Caught A Horse Taking Oats Away	Pythagorean Theorem
Evaluating Trig Functions	Solving Right Triangles
30-60-90 and Isosceles Right Triangles	Special Angles

Inside of Notes Sheet



The Pythagorean Theorem

Find the length of the opposite side.



$5^2 + b^2 = (5\sqrt{2})^2$

$25 + b^2 = 25 \cdot 2$

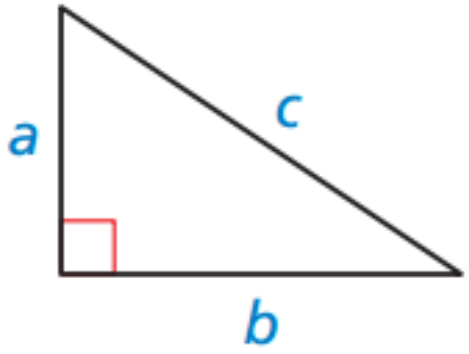
$25 + b^2 = 50$

$-25 \quad -25$

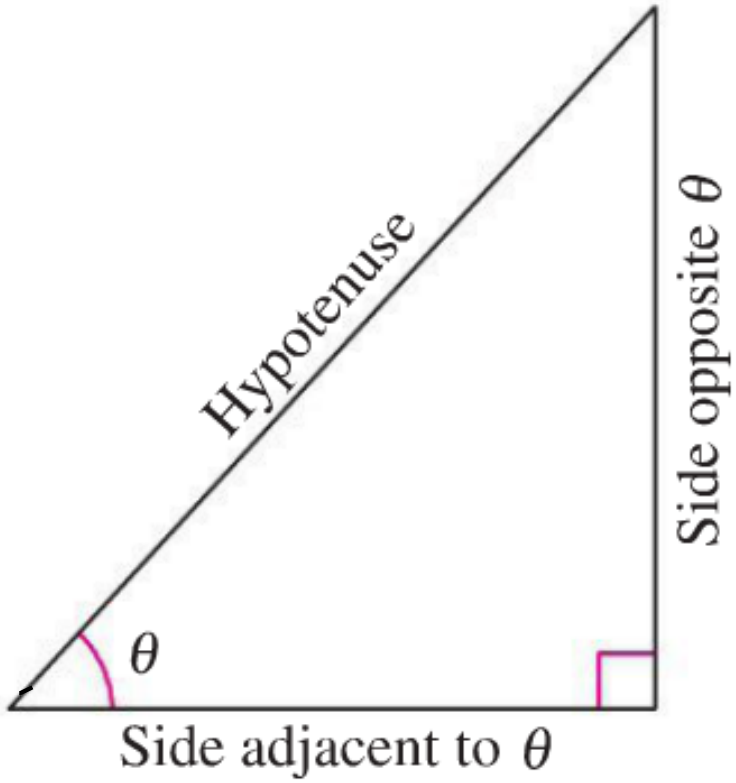
$b^2 = 25$

$b = 5$

The Pythagorean Theorem states that $a^2 + b^2 = c^2$ for a right triangle with hypotenuse of length c and legs of lengths a and b.



Right Triangle Definitions of Trig Functions (SOH-CAH-TOA)

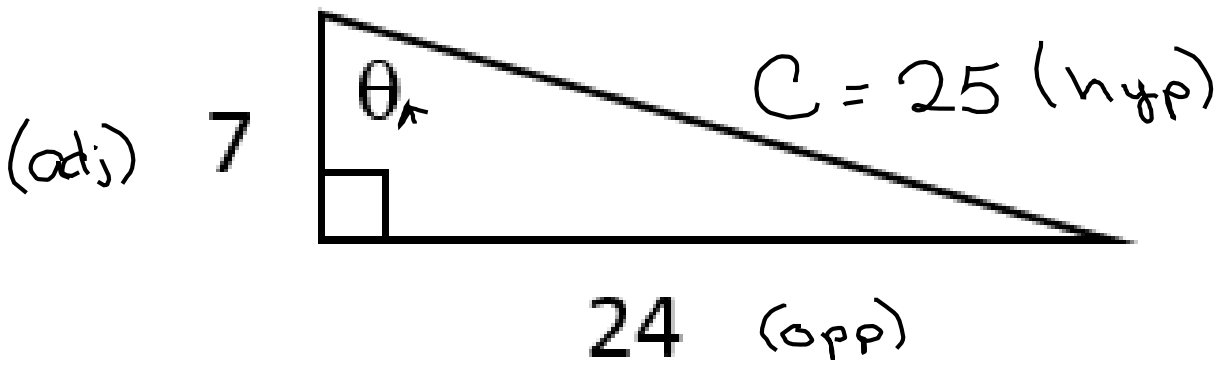


$\sin\theta = \frac{opp}{hyp}$ $\csc\theta = \frac{hyp}{opp}$

$\cos\theta = \frac{adj}{hyp}$ $\sec\theta = \frac{hyp}{adj}$

$\tan\theta = \frac{opp}{adj}$ $\cot\theta = \frac{adj}{opp}$

Find the values of the six trig functions of θ.



$24^2 + 7^2 = c^2$

$576 + 49 = c^2$

$625 = c^2$

$25 = c$

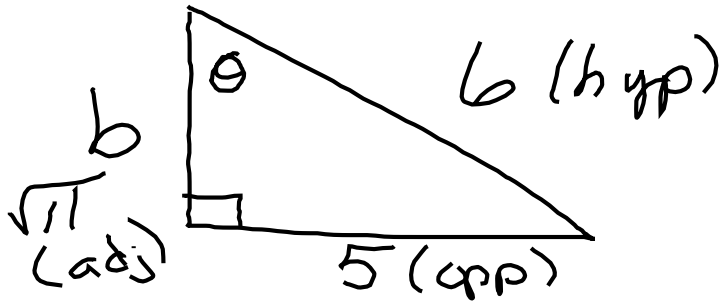
$\sin\theta = \frac{24}{25}$ $\quad \csc\theta = \frac{25}{24}$ (cosecant)

$\cos\theta = \frac{7}{25}$ $\quad \sec\theta = \frac{25}{7}$

$\tan\theta = \frac{24}{7}$ $\quad \cot\theta = \frac{7}{24}$

SOH-CAH-TOA

In a right triangle, θ is an acute angle and $\sin\theta = \frac{5}{6}$. Find the other five trig functions of θ.



$5^2 + b^2 = 6^2$

$25 + b^2 = 36$

$-25 \qquad -25$

$b^2 = 11$

$b = \sqrt{11}$

$\sin\theta = \frac{5}{6}$

$\cos\theta = \frac{\sqrt{11}}{6}$

$\tan\theta = \frac{5}{\sqrt{11}} \cdot \frac{\sqrt{11}}{\sqrt{11}} = \frac{5\sqrt{11}}{11}$

$\csc\theta = \frac{6}{5}$

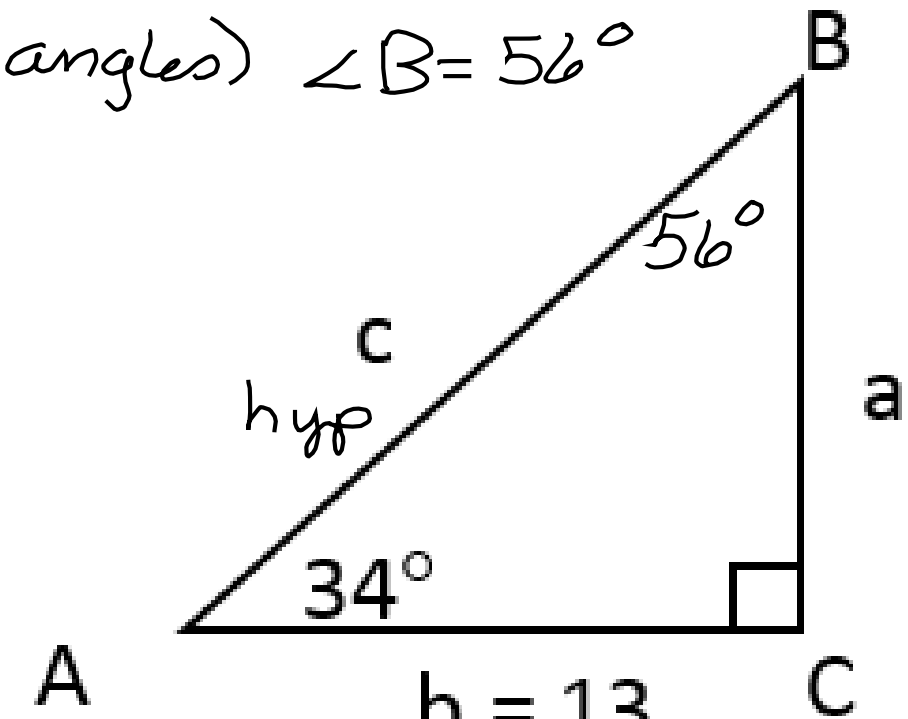
$\sec\theta = \frac{6\sqrt{11}}{11}$

$\cot\theta = \frac{\sqrt{11}}{5}$

$\frac{6}{\sqrt{11}} \rightarrow \frac{6\sqrt{11}}{11}$

SOH-CAH-TOA

Solve ΔABC. (find all sides & angles) $\angle B = 56°$



$$\frac{\cos 34°}{1} = \frac{13}{c}$$

$$c(\cos 34) = 13$$

$$c = \frac{13}{\cos 34}$$

$$15.68$$

$$\frac{\tan 34}{1} = \frac{a}{13}$$

$$13(\tan 34) = a$$

$$8.77 = a$$

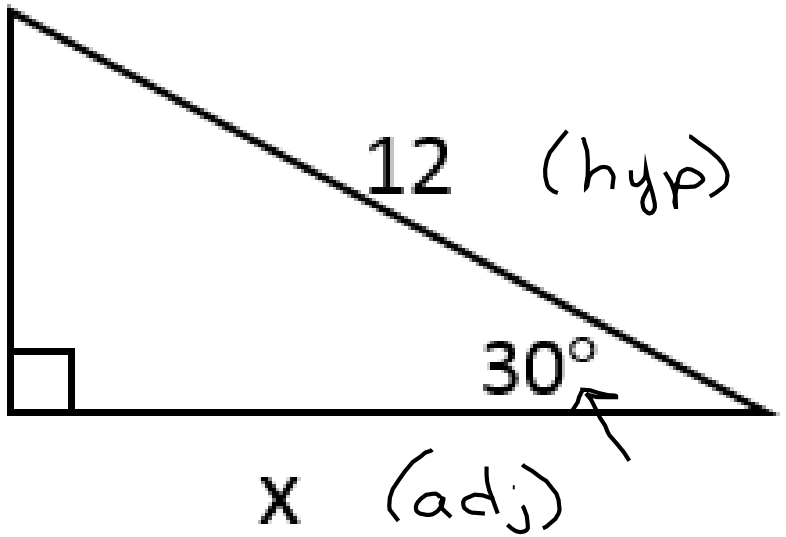
SOH - CAH - TOA

Find the value of x for the right triangle.

$\cos 30 = \frac{x}{12}$

$12 \cos 30 = x$

$x = 10.39$



SOH-CAH-TOA

Special Angles

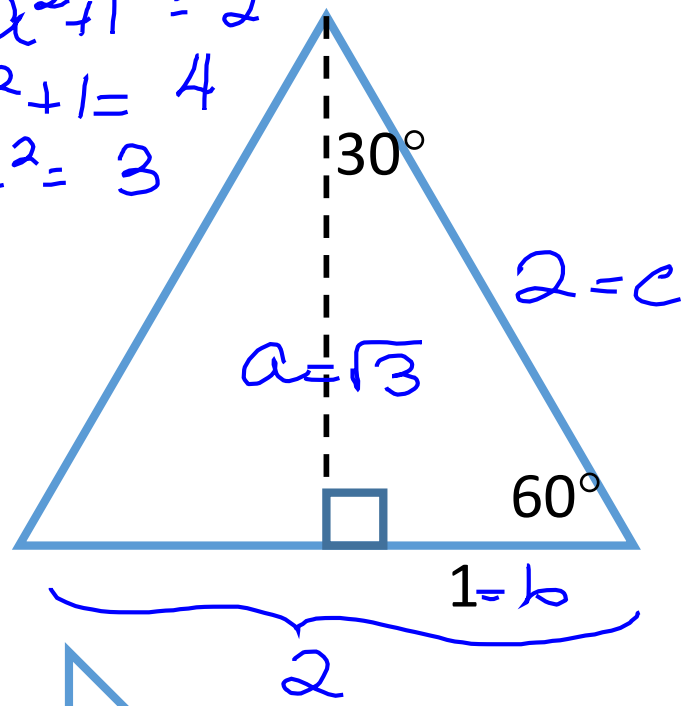
θ	sin θ	cos θ	tan θ	csc θ	sec θ	cot θ
30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\frac{2}{1}$	$\frac{2\sqrt{3}}{3}$	$\frac{\sqrt{3}}{1}$
45°	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{1}$	$\frac{\sqrt{2}}{1}$	$\frac{\sqrt{2}}{1}$	$\frac{1}{1}$
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{1}$	$\frac{2\sqrt{3}}{3}$	2	$\frac{\sqrt{3}}{3}$

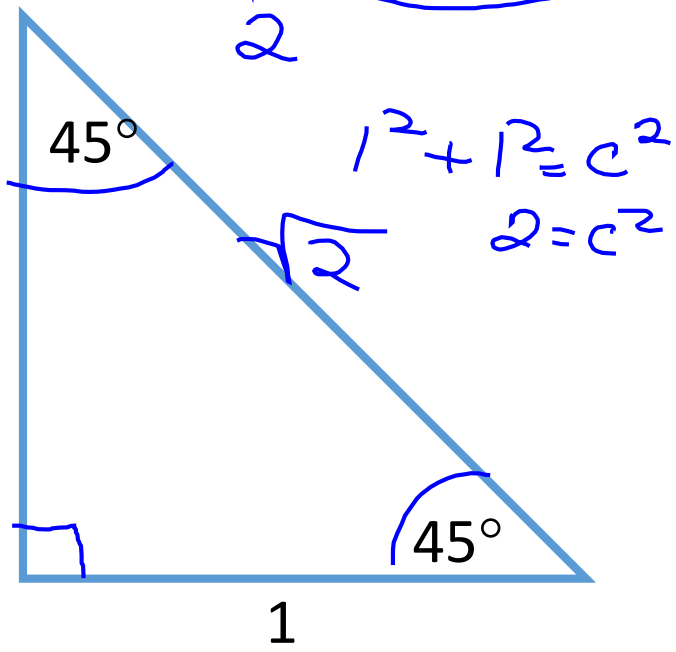
$a^2+1^2=2^2$

$a^2+1=4$

$a^2=3$

$a=\sqrt{3}$





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

$2=c^2$