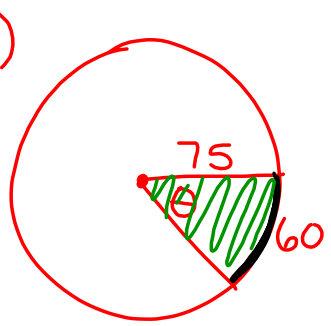
56)



$A = \frac{1}{2} r^2 \theta$ Area

$S = r\theta$ Arc length

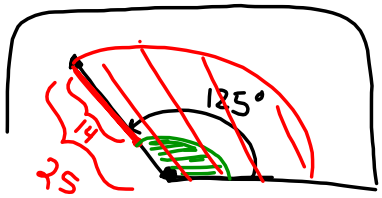
$60 = 75\theta$

$\frac{60}{75} = \theta$

$.8 \text{ rad} = \theta$

1 radian ≈ 57°

70)



$A_B = \frac{1}{2}(25)^2\left(\frac{25\pi}{36}\right) \approx$

$A_L = \frac{1}{2}(11)^2\left(\frac{25\pi}{36}\right) \approx$

$A = \frac{1}{2} r^2 \theta$ radians

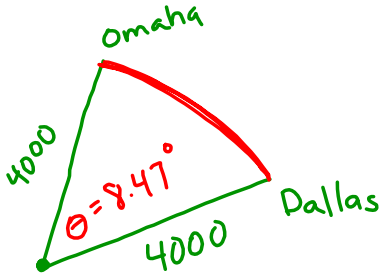
$125°\left(\frac{\pi}{180°}\right) = \frac{25\pi}{36}$

$A_{wiped} \Rightarrow 549.8 \text{ in}^2$

61) Dallas $32^\circ 47' 9''$

Omaha $41^\circ 15' 50''$

$32 + \frac{47}{60} + \frac{9}{3600} =$



$S = r\theta$

$S = 4000\left(\frac{8.47^\circ \pi}{180^\circ}\right)$

Section 4.3 Right Triangle Trigonometry

Quick Review: Label triangles & Pythagorean Theorem

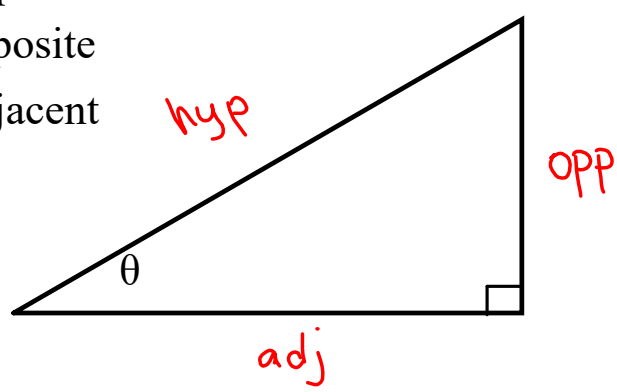
$a^2 + b^2 = c^2$

$(\text{leg})^2 + (\text{leg})^2 = (\text{hyp})^2$

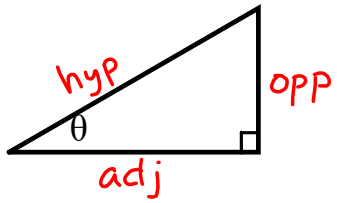
Hypotenuse

Opposite

Adjacent



Six Trig functions



SOHCAHTOA

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

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

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

cosecant

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

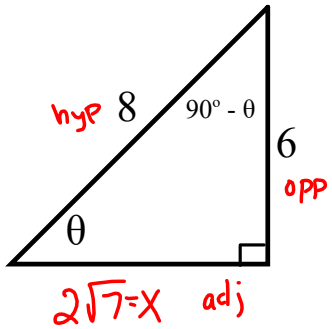
secant

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

cotangent

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

Find the value of all six trig functions



$x^2 + 6^2 = 8^2$

$x^2 = 64 - 36$

$x = \sqrt{\underset{4\cdot 7}{28}}$

$x = 2\sqrt{7}$

$\sin\theta = \frac{6}{8} = \frac{3}{4}$

$\cos\theta = \frac{2\sqrt{7}}{8} = \frac{\sqrt{7}}{4}$

$\tan\theta = \frac{6}{2\sqrt{7}} = \frac{3\sqrt{7}}{\sqrt{7}\sqrt{7}} = \frac{3\sqrt{7}}{7}$

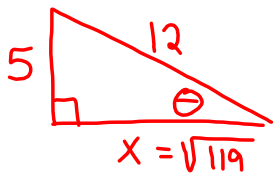
$\csc\theta = \frac{4}{3}$

$\sec\theta = \frac{4}{\sqrt{7}} = \frac{4\sqrt{7}}{7}$

$\cot\theta = \frac{\sqrt{7}}{3}$

Assume that θ is an acute angle in a right triangle satisfying the given conditions. Find the remaining trig functions.

$$\csc\theta = \frac{12}{5} \quad \begin{matrix}\text{hyp}\\ \text{opp}\end{matrix}$$



$\sin\theta = \frac{5}{12}$

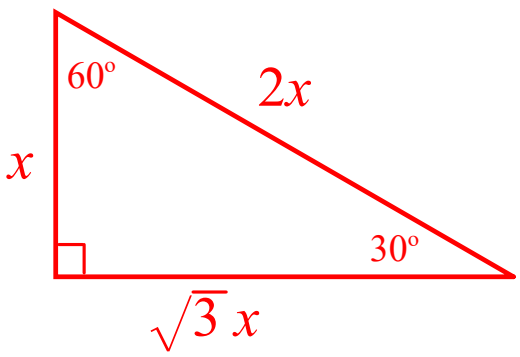
$\cos\theta = \frac{\sqrt{119}}{12}$

$\sec\theta = \frac{12}{\sqrt{119}} = \frac{12\sqrt{119}}{119}$

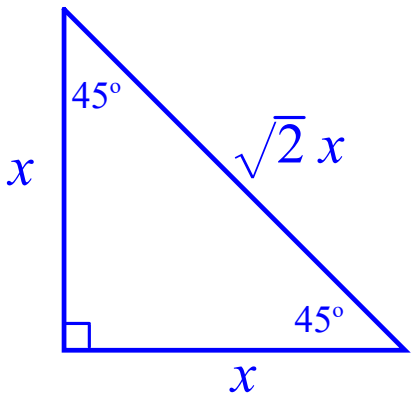
$\tan\theta = \frac{5}{\sqrt{119}} = \frac{5\sqrt{119}}{119}$

$\cot\theta = \frac{\sqrt{119}}{5}$

Special right triangles



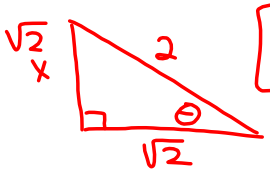
Alway find shortest side 1st



mult or Divide $\sqrt{2}$

Find each value of θ in degrees ($0^\circ < \theta < 90^\circ$) and radians ($0 < \theta < \pi/2$) without using a calculator.

a) $\cos\theta = \sqrt{2}/2$ (adj, hyp)



$x^2 + (\sqrt{2})^2 = 2^2$

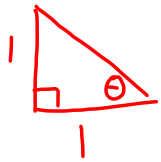
$x^2 + 2 = 4$

$x = \sqrt{2}$

$\boxed{\theta = 45^\circ}$ $(\pi/180^\circ)$

$\boxed{\theta = \frac{\pi}{4}}$

b) $\tan\theta = \frac{1}{1}$ (opp, adj)



$\theta = 45^\circ$

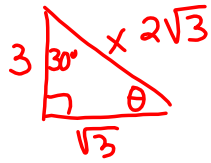
$\theta = \frac{\pi}{4}$

c) ~~$\csc\theta = \sqrt{2}$~~

$\cot\theta = \frac{\sqrt{3}}{3}$ (adj)

$\theta = 60^\circ$

$\theta = \frac{\pi}{3}$



$3^2 + (\sqrt{3})^2 = x^2$

$9 + 3 = x^2$

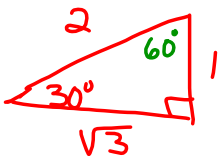
$\sqrt{12} = x$

Use the given function value(s) to find the exact value of each indicated trigonometric function.

$\sin 30^\circ = ½$ and $\tan 30^\circ = \sqrt{3}/3$ (opp, adj)

$\tan 30^\circ = \frac{\sqrt{3}}{3}$

a) $\csc 30^\circ = \frac{2}{1} = 2$

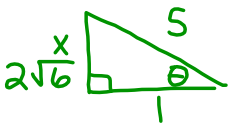


b) $\cot 60^\circ = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

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

Use the given function value(s) to find the exact value of each indicated trigonometric function.

$\sec\theta = \frac{5}{1}$ hyp / adj



$x^2 + 1^2 = 5^2$

$x = \sqrt{24}$

$x = 2\sqrt{6}$

a) $\cos\theta = \frac{1}{5}$

b) $\cot\theta = \frac{1}{2\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{6}}{12}$

c) $\cot(90^\circ - \theta) = 2\sqrt{6}$

d) $\sin\theta = \frac{2\sqrt{6}}{5}$

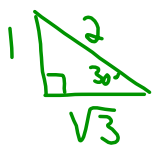
Evaluate without using a calculator.

$\sec\left(\frac{\pi}{3}\right) = \frac{2}{1} = 2$

$\cos\left(\frac{\pi}{6}\right)$

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

$\sin\frac{\pi}{4} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$



How do you find cotθ, cscθ, secθ on the calculator? ⇒ Mode

csc 19°

Degree Mode

$\frac{1}{\sin 19°} = 3.0715$

sec 1.24

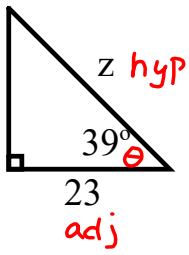
sec 1.24°

Radian Mode

$\frac{1}{\cos 1.24}$

$\frac{1}{\tan\theta}$

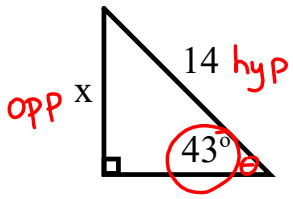
Solve for the variable shown.



29.6

$\cos 39° = \frac{23}{z}$

$z = \frac{23}{\cos 39°}$



$\sin 43° = \frac{x}{14}$

$14 \sin 43° = x$

$x = 9.5$

Section 4.3 Pg. 284-287

Problems: #7, 13, 15, 21, 23-28, 31, 33, 37, 39, 53, 55, 58, 66, 67, 82