4-3 Right Triangle Trigonometry

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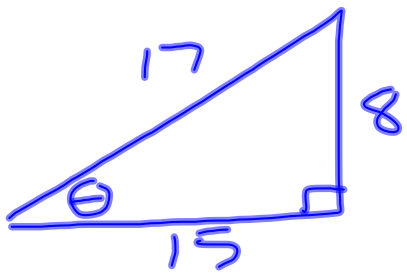


sin θ = $\frac{8}{17}$

cos θ = $\frac{15}{17}$

tan θ = $\frac{8}{15}$

cot θ = $\frac{15}{8}$

sec θ = $\frac{17}{15}$

csc θ = $\frac{17}{8}$

Ex 1 Use special right triangles to find each of the following

sin 45° $\frac{\sqrt{2}}{2}$

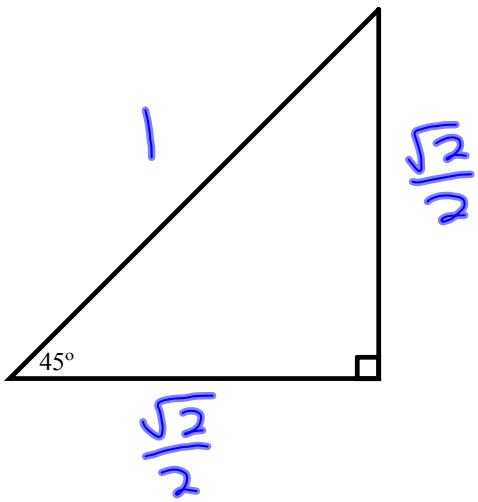
cos 45° $\frac{\sqrt{2}}{2}$

tan 45° 1

cot 45° 1

sec 45° $\frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

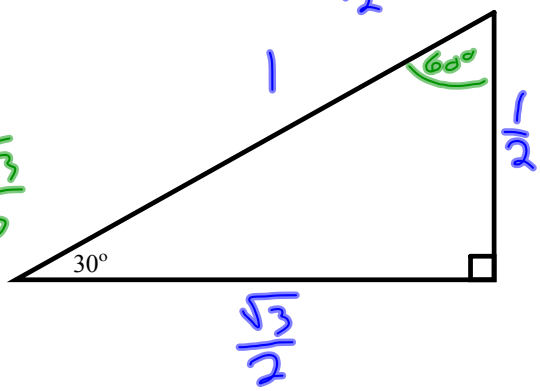
csc 45° $\sqrt{2}$



Ex 2 Use special right triangles to find each of the following

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

$\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{\sqrt{3}}$



$\sin(90 - \theta) = \cos\theta$

$\cos(90 - \theta) = \sin\theta$

$\tan(90 - \theta) = \cot\theta$

$\cot(90 - \theta) = \tan\theta$

$\sec(90 - \theta) = \csc\theta$

$\csc(90 - \theta) = \sec\theta$

Ex 3 If $\sin\theta = \frac{3}{8}$ and θ is in quadrant I, find each of the following

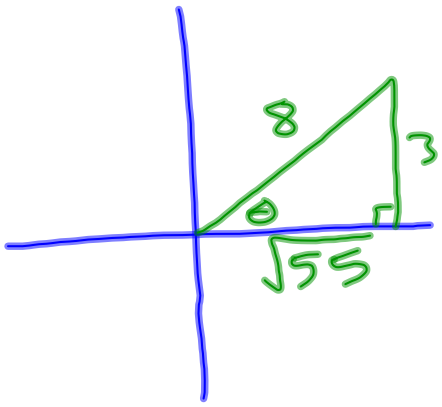
cos θ $\frac{\sqrt{55}}{8}$

tan θ $\frac{3}{\sqrt{55}} = \frac{3\sqrt{55}}{55}$

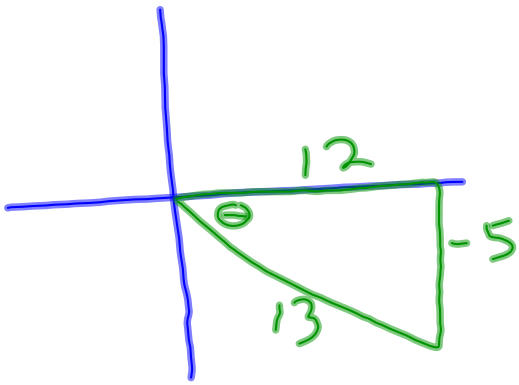
cot θ $\frac{\sqrt{55}}{3}$

sec θ $\frac{8}{\sqrt{55}} = \frac{8\sqrt{55}}{55}$

csc θ $\frac{8}{3}$



Ex 4 If $\cos\theta = \frac{12}{13}$ and θ is in quadrant IV, find each of the following



sin θ $-\frac{5}{13}$

cos θ $\frac{12}{13}$

tan θ $-\frac{5}{12}$

cot θ $-\frac{12}{5}$

sec θ $\frac{13}{12}$

csc θ $-\frac{13}{5}$

Ex 5 Use a calculator to find:

sin 10° $\approx .174$

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sin(10
        .1736481777
sin(π/5
        .5877852523
1/sin(20
        2.9238044
```

$\sin\frac{\pi}{5} \approx .588$

csc 20° ≈ 2.924

Homework
p.284
#1-25, 57-61
odds