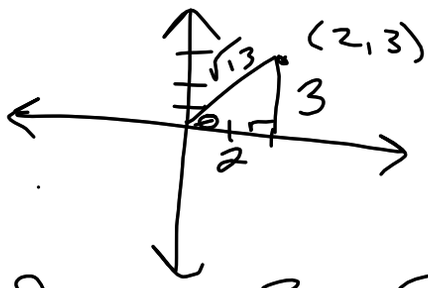
Warm-up

1. Find $\sqrt{25} = 5$

2. Solve $\sqrt{x^2} = \sqrt{4}$ $x = \pm 2$

3. explain the difference

Find all 6 Trig. functions given point (2,3)



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

$2^2+3^2=c^2$

$4+9=c^2$

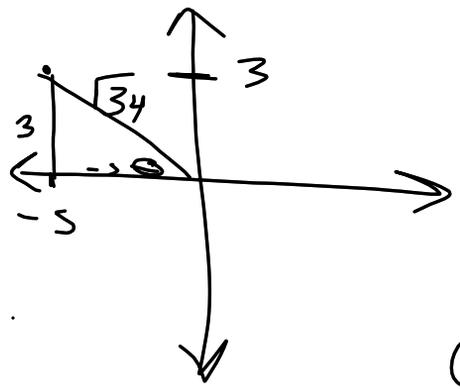
$\sqrt{13}=c$

$\sin\theta=\frac{3}{\sqrt{13}}\cdot\frac{\sqrt{13}}{\sqrt{13}}=\frac{3\sqrt{13}}{13}$ $\cos\theta=\frac{2}{\sqrt{13}}\cdot\frac{\sqrt{13}}{\sqrt{13}}=\frac{2\sqrt{13}}{13}$

$\tan\theta=\frac{3}{2}$ $\sec\theta=\frac{\sqrt{13}}{2}$ $\csc\theta=\frac{\sqrt{13}}{3}$

$\cot\theta=\frac{2}{3}$

2. $(-5, 3)$



$-5^2+3^2=c^2$

$25+9=c^2$

$c=\sqrt{34}$

$\sin\theta=\frac{3}{\sqrt{34}}\cdot\frac{\sqrt{34}}{\sqrt{34}}=\frac{3\sqrt{34}}{34}$

$\cos\theta=\frac{-5}{\sqrt{34}}\cdot\frac{\sqrt{34}}{\sqrt{34}}=\frac{-5\sqrt{34}}{34}$

$\tan\theta=\frac{-3}{5}$

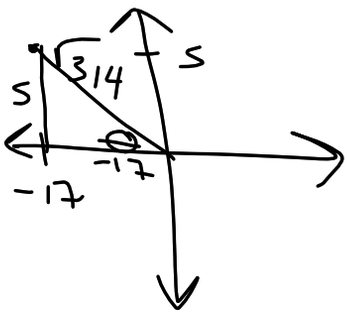
$\csc\theta=\frac{\sqrt{34}}{3}$

$\sec\theta=\frac{\sqrt{34}}{-5}$

$\cot\theta=-\frac{5}{3}$

you do

#1 ~~#3~~



$17^2 + 5^2 = c^2$

$289 + 25 = c^2$

$\sqrt{314} = \sqrt{c^2}$

$\sqrt{314} = c$

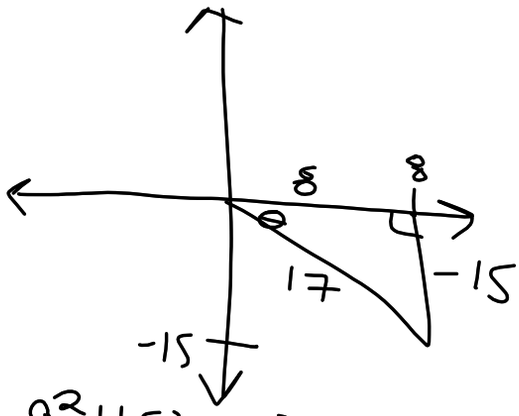
$\sin\theta = \frac{5}{\sqrt{314}} \cdot \frac{\sqrt{314}}{\sqrt{314}} = \frac{5\sqrt{314}}{314}$

$\cos\theta = \frac{-17\sqrt{314}}{314}$ $\tan\theta = \frac{5}{-17}$

$\csc\theta = \frac{\sqrt{314}}{5}$ $\cot\theta = \frac{-17}{5}$

$\sec\theta = \frac{\sqrt{314}}{-17}$

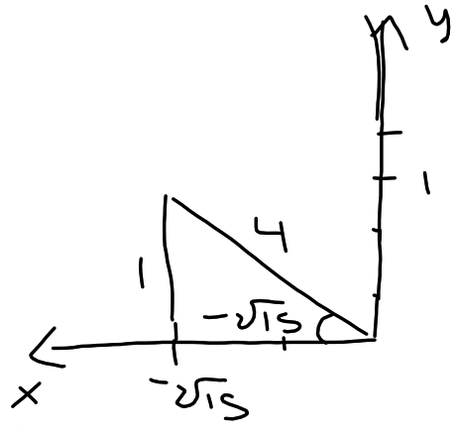
c. $\tan\Theta = -\frac{15}{8}$ (opp/adj)
in quadrant IV



$8^2+15^2=c^2$
$64+225=c^2$
$\sqrt{289}=\sqrt{c^2}$
$c=17$

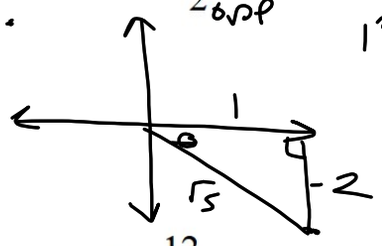
$\sin\Theta=\frac{-15}{17}$ $\csc\Theta=\frac{17}{-15}$
$\cos\Theta=\frac{8}{17}$ $\sec\Theta=\frac{17}{8}$
$\tan\Theta=\frac{-15}{8}$ $\cot\Theta=\frac{-8}{15}$

d. $\csc\Theta = 4$,
in quadrant II



$\sin\Theta=\frac{1}{4}$
$\cos\Theta=\frac{-\sqrt{15}}{4}$
$\tan\Theta=\frac{-\sqrt{15}}{15}$
$\csc\Theta=4$
$\sec\Theta=\frac{-4\sqrt{15}}{15}$
$\cot\Theta=-\sqrt{15}$

1) $\cot\theta = -\frac{1}{2}$ and $\cos\theta > 0$

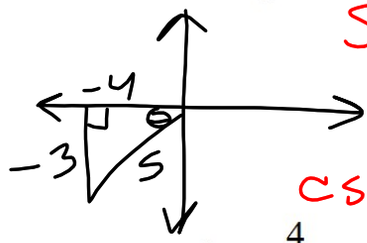


$1^2+2^2=c^2$

$1+4=c^2$

$\sqrt{5}=c$

2) $\tan\theta = \frac{3}{4}$ and $\cos\theta < 0$



$\sin\theta = \frac{-3}{5}$

$\cos\theta = \frac{-4}{5}$

$\csc\theta = \frac{-5}{3}$

$\sec\theta = \frac{5}{-4}$

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

3) $\cot\theta = \frac{12}{5}$ and $\cos\theta > 0$

$\sin\theta = \frac{-2}{\sqrt{5}} = \frac{-2\sqrt{5}}{5}$

$\cos\theta = \frac{\sqrt{5}}{5}$

$\tan\theta = -2$

$\csc\theta = \frac{\sqrt{5}}{-2}$

$\sec\theta = \sqrt{5}$

4) $\cos\theta = -\frac{4}{5}$ and $\sin\theta > 0$

Solve

1. $\sin\theta = \frac{\sqrt{3}}{2}$ when $0 \leq \theta < 360$ and $0 \leq \theta \leq 2\pi$

2. $\tan\theta = -\sqrt{3}$

3. $\csc\theta = 2$

In order to get one answer we must restrict the domain.

$\arcsin\theta$ $-90^\circ \leq \theta \leq 90^\circ$ $-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$

$\arccos\theta$ $0^\circ \leq \theta \leq 180^\circ$ $0 \leq \theta \leq \pi$

$\arctan\theta$ $-90^\circ < \theta < 90^\circ$ $0 < \theta < \frac{\pi}{2}$

$\text{arccot}\,\theta$ $0^\circ < \theta < 180^\circ$ $0 < \theta < \pi$

arccsc and arcsec have the same domain as the reciprocal

we will understand this more when we graph.

Simplify

1) $\sec^{-1}\left(-\sqrt{2}\right)$

2) $\cot^{-1} 0$

3) $\sin^{-1} 1$

Composition of functions

1) $\csc \sec^{-1} \frac{2\sqrt{3}}{3}$

2) $\sin^{-1}(\sec \pi)$

3) $\cos \cot^{-1} \frac{2}{3}$

4) $\sin \sec^{-1} \frac{7\sqrt{10}}{20}$

Write as an algebraic expression

5) $\cos \sin^{-1} x$

6) $\sec \tan^{-1} x$

7) $\sec \cos^{-1} x$