Lesson 71 Objective: SWBAT determine all trigonometric functions given one.

Kickoff

-Put your Weekly HW Quiz on my desk!! Then answer the following:

Solve for all values of θ, given: $\tan\theta = \frac{3}{7}$

$\theta = \tan^{-1}(3/7)$

Ref $\theta = 23$

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$\theta = 23$

$\theta = 180 + 23 = 203$

$\sin\theta = -.8$ Ref $= 55 \cdot \frac{\pi}{180} = \frac{11\pi}{36}$

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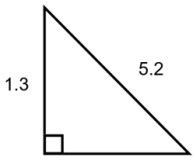
$\theta = \pi + \frac{11\pi}{36} = \frac{47\pi}{36}$

$\theta = 2\pi - \frac{11\pi}{36} = \frac{61\pi}{36}$

Try This: Solve for the missing side given the triangle below:



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

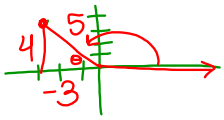
$1.3^2 + b^2 = 5.2^2$

$b^2 = 25.35$

$b = 5.0$

Finding Missing Trig Functions

Example #1: If θ is an angle in standard position and $P(-3,4)$ is a point on the terminal side of θ, evaluate all **six trigonometric functions**.



$4^2 + 3^2 = c^2$

$16 + 9 = c^2$

$25 = c^2$

$5 = c$

$\sin\theta = \frac{4}{5}$ $\csc\theta = \frac{5}{4}$

$\cos\theta = \frac{-3}{5}$ $\sec\theta = \frac{5}{3}$

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

Example #2: If $\tan\theta = \frac{\sqrt{7}}{3}$ and θ terminates in quadrant III, **find all six trigonometric functions.**

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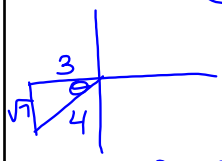

$(\sqrt{7})^2 + 3^2 = c^2$

$7 + 9 = c^2$

$\sqrt{16} = c^2$

$4 = c$

$\sin\theta = -\frac{\sqrt{7}}{4}$ $\csc\theta = -\frac{4}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = -\frac{4\sqrt{7}}{7}$

$\cos\theta = -\frac{3}{4}$ $\sec\theta = -\frac{4}{3}$

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

Example #3: If $\sec\theta = \frac{\sqrt{13}}{2}$ and $\tan\theta < 0$, evaluate all **six trigonometric functions.**

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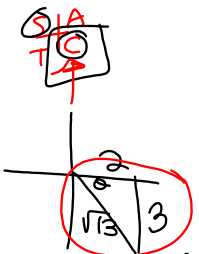

$2^2 + b^2 = \sqrt{13}^2$

$4 + b^2 = 13$

$b^2 = 9$

$b = 3$

$\sin\theta = \frac{3\sqrt{13}}{13}$ $\csc\theta = \frac{\sqrt{13}}{3}$

$\cos\theta = \frac{2\sqrt{13}}{13}$ $\sec\theta = \frac{\sqrt{13}}{2}$

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