Homework 7-6

1a. 5/13 b. 5/13

2. -0.98

3a. ±3/5 b. Depends on what quadrant θ is in. c. 4/5

4. -3/5

5a. 0.8 b. -0.8, 323.1°

6. No. ex: sin(90) ≠ sin(30) + sin(60), 1≠1.366

7. 28.9"

Aug 13-8:03 PM

Name: Key

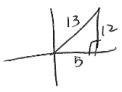
Period :

Algebra 2 Homework 7-6

1. On a unit circle, $\sin(\theta)=\frac{12}{13}$ and θ is acute. What is the exact values of $\cos(\theta)$?

a. Find your answer by drawing the triangle in the correct quadrant in standard position.

QI



$\cos(\theta)=\frac{5}{13}$

b. Find your answer using the Pythagorean Identity.

$\sin^2\theta+\cos^2\theta=1$

$\left(\frac{12}{13}\right)^2+\cos^2\theta=1$

$\frac{144}{169}+\cos^2\theta=\frac{169}{169}$

$\sqrt{\cos^2\theta}=\sqrt{\frac{25}{169}}$

$\cos\theta=\pm\frac{5}{13}$

QI $\cos(t)$ $+\frac{5}{13}$

2. Using the identity $\sin^2(\theta)+\cos^2(\theta)=1$, find the value of $\tan(\theta)$, to the nearest hundredth, if $\sin(\theta)$ is 0.7 and θ is in Quadrant II. **(Regents question)**

$(.7)^2+\cos^2\theta=1$

$.49+\cos^2\theta=1$

$\sqrt{\cos^2\theta}=\sqrt{.51}$

$\cos\theta=\pm.714$

QII $\cos\theta<0$

$\therefore \cos(\theta)=-.714$

$\tan(\theta)=\frac{\sin(\theta)}{\cos(\theta)}=\frac{.7}{-.714}=-.98$

3. a. If $\cos(\theta)=\frac{4}{5}$, what are **two** possible values for $\sin(\theta)$?

$\sin^2\theta+\left(\frac{4}{5}\right)^2=1$

$\sin^2\theta+\frac{16}{25}=\frac{25}{25}$

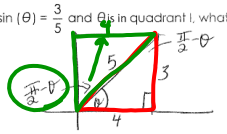
$\sqrt{\sin^2\theta}=\sqrt{\frac{9}{25}}$

$\sin(\theta)=\pm\frac{3}{5}$

b. Why are there two possible values for $\sin(\theta)$?

depends what quadrant the angle is in. QI, II (+) QIII, IV (-)

c. If $\sin(\theta)=\frac{3}{5}$ and θ is in quadrant I, what is $\sin\left(\frac{\pi}{2}-\theta\right)$?



$\sin\left(\frac{\pi}{2}-\theta\right)=\frac{4}{5}$

4. Given $\sin(\theta)=\frac{4}{5}$, and θ is an obtuse angle less than π radians, use the Pythagorean identity to find the exact values of $\cos(\theta)$.

QII

$\sin^2\theta+\cos^2\theta=1$

$\left(\frac{4}{5}\right)^2+\cos^2\theta=1$

$\frac{16}{25}+\cos^2\theta=\frac{25}{25}$

$\sqrt{\cos^2\theta}=\sqrt{9/25}$

$\cos(\theta)=\pm 3/5$

QII $\cos(\theta)<0$

$\therefore \cos(\theta)=-3/5$

5. Using the identity $\sin^2(\theta)+\cos^2(\theta)=1$, if $\sin(\theta)$ is -0.6 and θ is in Quadrant IV,

a. Find $\cos(\theta)$ to the nearest tenth.

$\sin^2\theta+\cos^2\theta=1$

$(-.6)^2+\cos^2\theta=1$

$\cos^2\theta=.64$

$\cos\theta=\pm.8$

QIV $\cos(\theta)>0$

$\cos(\theta)=.8$

b. Find $\tan(\theta)$ and ~~cot(θ)~~ to the nearest tenth.

$\tan(\theta)=\frac{\sin(\theta)}{\cos(\theta)}=\frac{-.6}{.8}=-.75=-.8$

QIV $\alpha=\cos^{-1}(.8)=36.9°$

$\theta=360-36.9=323.1°$

180−α, 180+α, 360−α

6. Does $\sin(A+B)=\sin(A)+\sin(B)$? Justify your answer by substituting numbers for A and B.

No

Let $A=30°$ $B=60°$

$\sin(30+60)\stackrel{?}{=}\sin(30)+\sin(60)$

$\sin(90)\stackrel{?}{=}\sin(30)+\sin 60$

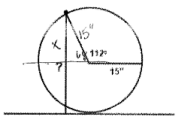
$1\stackrel{?}{=}.5+.866$

$1\neq 1.366$

A: 9

B: 2

7. A wheel with a dot on its edge rolls on the ground. The radius of the wheel is 15". When the dot is at the position shown below, at an angle of 112°, what is the distance of the dot above the ground, to the nearest tenth of an inch?



$\sin 68°=\frac{x}{15}$

$x=15\sin 68=13.9"$

$+15$

$28.9"$

Day 7: Reciprocal Functions

Aug 9-4:56 PM

secant → $\sec(\theta) = \frac{1}{\cos(\theta)}$ where $\cos(\theta) \neq 0$

cosecant → $\csc(\theta) = \frac{1}{\sin(\theta)}$ where $\sin(\theta) \neq 0$

cotangent → $\cot(\theta) = \frac{1}{\tan(\theta)}$ where $\tan(\theta) \neq 0$

remember: $\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$ $\cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$

Reciprocal functions have equivalent signs.

csc S	A
cot T	C sec

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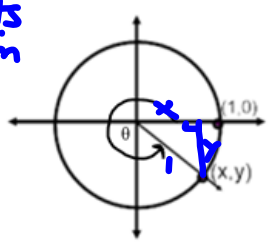
Reciprocal Function Examples:

1. If sin(A) = 3/5, then csc(A) = 5/3
2. If tan(A) = 17/12, then cot(A) = 12/17
3. a. If cos(A) = -6/9, then sec(A) = -9/6.
   b. What quadrant(s) could angle A be in? III, II
4. If cos(A) > 0, which must always be true?
   a. sin(A) > 0 c. sec(A) > 0
   b. tan(A) > 0 d. csc(A) > 0
5. Using the unit circle below, explain why csc(θ) = 1/y.

Regents Question



If the $\sin(\theta) = \frac{y}{1}$ and $\csc(\theta)$ is a reciprocal function of $\sin(\theta)$ then $\csc(\theta) = \frac{1}{y}$.

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Finding Trig Values:

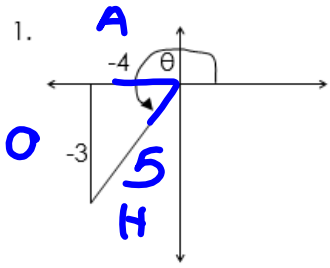
The value of a specific function can be found if you know:

a. coordinates of a point on the terminal side OR

b. another function value & quadrant in which the angle lies.

Note: r = radius of the circle (and hypotenuse), and the radius will always be positive.

1.



Find:

a. r = 5

b. $\sin(\theta) = -\frac{3}{5}$ e. $\csc(\theta) = -\frac{5}{3}$

c. $\cos(\theta) = -\frac{4}{5}$ f. $\sec(\theta) = -\frac{5}{4}$

d. $\tan(\theta) = \frac{3}{4}$ g. $\cot(\theta) = \frac{4}{3}$

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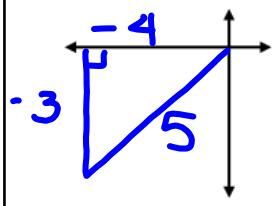
2. If $\tan(\theta) = \frac{3}{4}$ and θ is in Quad III, find $\csc(\theta)$.

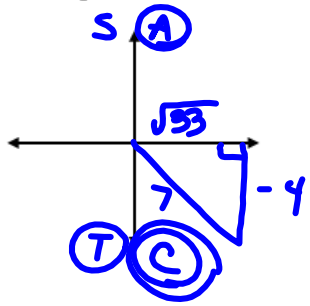


S O/H

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

III IV IV I cos

3. If $\sin(\theta) = -\frac{4}{7}$ and $\sec(\theta) > 0$, determine the quadrant in which θ lies, sketch the triangle and find the remaining trig functions.



$x = \sqrt{49 - 16}$

$x = \sqrt{33}$

$\sin(\theta) = \frac{-4/7}{\sqrt{33}/7}$ $\csc(\theta) = \frac{-7/4}{7/\sqrt{33}}$

$\cos(\theta) = \frac{\sqrt{33}/7}{-4/\sqrt{33}}$ $\sec(\theta) = \frac{7/\sqrt{33}}{-\sqrt{33}/4}$

$\tan(\theta) = \frac{-4/\sqrt{33}}{\quad}$ $\cot(\theta) = \frac{-\sqrt{33}/4}{\quad}$

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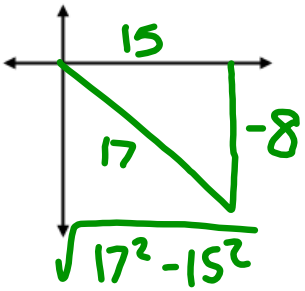
4. If $\cos(\theta) = \frac{15}{17}$ and θ lies in quadrant IV, sketch the triangle and find the remaining trig functions.

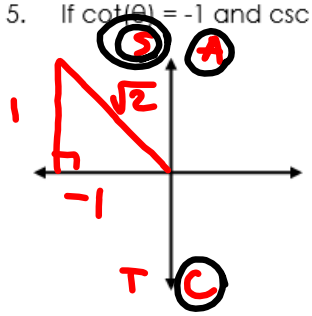


$\sin(\theta) = \frac{-8}{17}$ $\csc(\theta) = \frac{17}{-8}$

$\cos(\theta) = \frac{15}{17}$ $\sec(\theta) = \frac{17}{15}$

$\tan(\theta) = \frac{-8}{15}$ $\cot(\theta) = \frac{-15}{8}$

5. If $\cot(\theta) = -1$ and $\csc(\theta) = \sqrt{2}$, find $\cos(\theta)$.



$\cos(\theta) = \frac{-1}{\sqrt{2}}$

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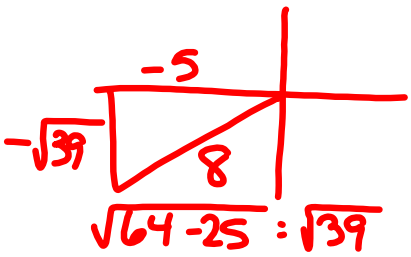
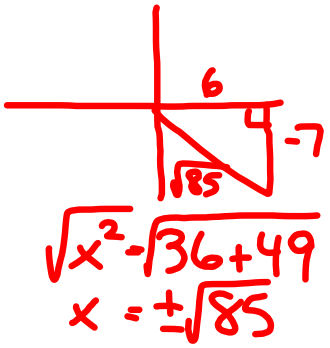
6. If the radius of a circle is 8, ∠θ is in quadrant III, and the x-coordinate of a point on the terminal side of ∠θ is -5, find the sin (θ).



$\sin(\theta) = \frac{-\sqrt{39}}{8}$

7. If the terminal side of ∠θ passes throught the point (6, -7), sketch the angle in standard form and find all of the trig functions.



$\sin(\theta) \frac{-7}{\sqrt{85}}$ $\csc(\theta) \frac{-\sqrt{85}}{7}$

$\cos(\theta) \frac{6}{\sqrt{85}}$ $\sec(\theta) \frac{\sqrt{85}}{6}$

$\tan(\theta) \frac{-7}{6}$ $\cot(\theta) \frac{-6}{7}$

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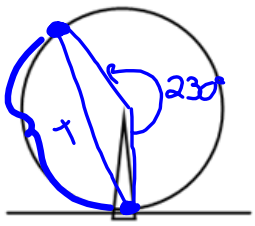
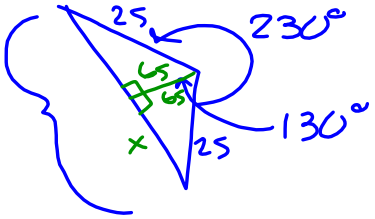
Application Word Problem:

A passenger boards a Ferris wheel ride directly below the center. The wheel has a radius of 25 feet. His friend takes a picture of him when the wheel has rotated 230° counterclockwise. What is the straight-line distance of the man from his starting position when the picture was taken, rounded to the nearest tenth?





$\sin 65° = \frac{x}{25}$

$x = 22.657$

$\times 2$

45.3 feet

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Jan 4-1:12 PM