Homework 7-7

Review/Unit 7 Test now Thursday/Friday
Day 1 of next Unit on Wednesday
A Castle Learning Unit 7 Review is available

Also there are 2 reviews at the end of your packet. The first one is our in class review. The 2nd/very last one is an extra review for you.

1. -3/5

2a. 0.8 b. -0.75, 321.1°

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

4. -8/17, 15/17, 331.9°

Aug 13-8:03 PM

Name: Key
Period :

Algebra 2 Homework 7-7

1. 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 $\cos(\theta) < 0$
$\therefore \cos(\theta) = -3/5$

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

$\sin^2(\theta) + \cos^2(\theta) = 1$
$(-.6)^2 + \cos^2(\theta) = 1$
$.36 + \cos^2(\theta) = 1$
$\sqrt{\cos^2\theta} = \sqrt{.64}$
$\cos(\theta) = \pm .8$
QIV $\cos(\theta) > 0$
$\therefore \cos(\theta) = .8$

   b. Find exact $\tan(\theta)$ and $m\angle\theta$ to the nearest tenth.

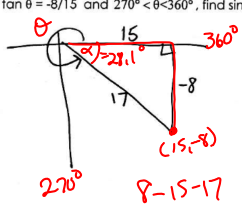
$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)} = \frac{-.6}{.8} = -.75$
$\alpha = \tan^{-1}(.75) = 38.9°$
$\theta = 360 - 38.9 = 321.1°$

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

Let $A = 30°$, $B = 60°$
$\sin(30+60) \stackrel{?}{=} \sin(30) + \sin(60)$
$\sin(90) \stackrel{?}{=} .5 + .866$
$1 \neq 1.366$

NO

4. If $\tan\theta = -8/15$ and $270° < \theta < 360°$, find $\sin(\theta)$, $\cos(\theta)$ and $m\angle\theta$ nearest tenth. QIV O/A



$\sin(\theta) = \frac{-8}{17}$
$\cos(\theta) = \frac{15}{17}$
$\alpha = \tan^{-1}\left(\frac{8}{15}\right) = 28.1$
$\alpha = \cos^{-1}(15/17) = $ "
$\alpha = \sin^{-1}(8/17) = $ "
$m\angle\theta = 360 - 28.1 = 331.9°$

Day 8: 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 $\tan\theta \neq 0$

$\boxed{\begin{array}{l} \text{Reciprocals} \\ \sin\theta \text{ — } \csc\theta \\ \cos\theta \text{ — } \sec\theta \\ \tan\theta \text{ — } \cot\theta \end{array}}$

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

Reciprocal functions have = or Same signs.

S	A
T	C

Aug 9-4:57 PM

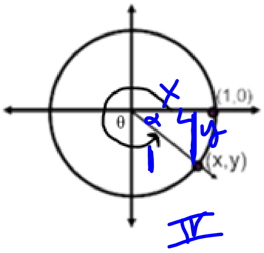
S | A
T | C

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? II or III
4. If cos(A) > 0, which must always be true?
   a. sin(A) > 0
   b. tan(A) > 0
   c. sec(A) > 0
   d. csc(A) > 0
5. Using the unit circle below, explain why csc(θ) = 1/y.

r=1

$\sin\theta = \frac{y}{1} = y$



$\sin\theta = \frac{y}{1} = y \longrightarrow \csc\theta = \frac{1}{y}$

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Finding Trig Values: SOH CAH TOA

Pyth Triples
3-4-5
5-12-13
8-15-17
7-24-25

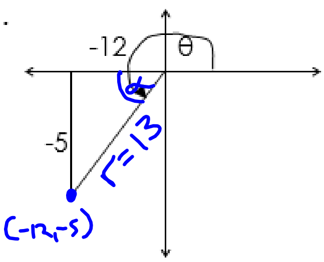
The value of a specific function can be found if you know:

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 = 13

b. sin(θ) = $\frac{-5}{13}$

c. cos(θ) = $\frac{-12}{13}$

d. tan(θ) = $\frac{-5}{-12} = \frac{5}{12}$

e. csc(θ) = $-\frac{13}{5}$

f. sec(θ) = $-\frac{13}{12}$

g. cot(θ) = $\frac{12}{5}$

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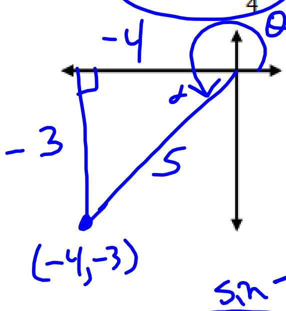
2. If $\tan(\theta) = \frac{3}{4}$ and θ is in Quad III, find csc(θ).



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

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

Add

$m\angle\alpha = \sin^{-1}\left(\frac{3}{5}\right) = 37°$

$= \cos^{-1}\left(\frac{4}{5}\right) = 37°$

$= \tan^{-1}\left(\frac{3}{4}\right) = 37°$

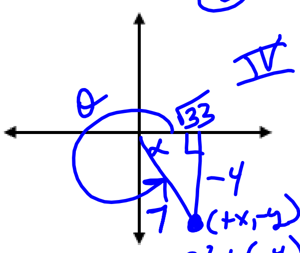
$m\angle\theta = 180 + 37° = 217°$

S | A
T | C

sin − III, IV

sec +, cos + I, IV

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



$a^2 + (-4)^2 = 7^2$

$a^2 = 49 - 16$

$a^2 = 33$

$a = \pm\sqrt{33}$

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

$\cos(\theta) = \frac{\sqrt{33}}{7}$ $\sec(\theta) = \frac{7}{\sqrt{33}} \cdot \frac{\sqrt{33}}{\sqrt{33}} = \frac{7\sqrt{33}}{33}$

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

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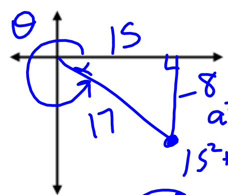
4. If $\cos(\theta) = \frac{15}{17} = \frac{A}{H}$ and θ lies in quadrant IV, sketch the triangle and find the remaining trig functions.



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

$15^2 + b^2 = 17^2$

$b = 8$

$\sin(\theta) = -8/17$ $\csc(\theta) = -17/8$

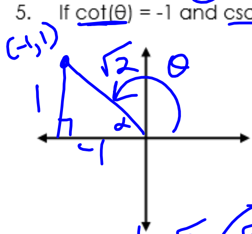
$\cos(\theta) = 15/17$ $\sec(\theta) = 17/15$

$\tan(\theta) = -8/15$ $\cot(\theta) = -15/8$

$-\frac{8}{17} = \frac{8}{-17} = -\frac{8}{17}$

cot − tan − II, IV csc, sin + I, II

5. If cot(θ) = -1 and csc(θ) = √2 , find cos(θ).



$\cot = \frac{-1}{1}$ $\tan = \frac{1}{-1} = -1$

$-\frac{1}{2} = \frac{-1}{2} = \frac{1}{-2}$

$\csc\theta = \sqrt{2}$ $\sin\theta = \frac{1}{\sqrt{2}} = \frac{O}{H}$

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

$\cot = -1 = \frac{A}{O} = \frac{-}{1}$ | $\tan = -1 = \frac{O}{A} = \frac{1}{-}$

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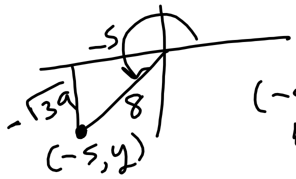
6. If the radius of a circle is 8, ∠θ is in quadrant III, and the x-coordinate of a point on the terminal side of ∠θ is -5, find the sin (θ).



$\sin\theta = ?$ $\quad -\frac{\sqrt{39}}{8}$

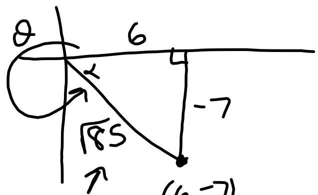
$(-5)^2 + b^2 = 8^2$

$b^2 = 64 - 25 = 39$

$b = \sqrt{39}$

$(+,-) \rightarrow$ Q IV

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.



$\sin\theta = \frac{-7}{\sqrt{85}} = \frac{-7\sqrt{85}}{85}$ $\qquad \csc\theta = \frac{\sqrt{85}}{-7}$

$\cos\theta = \frac{6}{\sqrt{85}} = \frac{6\sqrt{85}}{85}$ $\qquad \sec\theta = \frac{\sqrt{85}}{6}$

$\tan\theta = \frac{-7}{6}$ $\qquad \cot\theta = \frac{-6}{7}$

$6^2 + (-7)^2 = c^2$

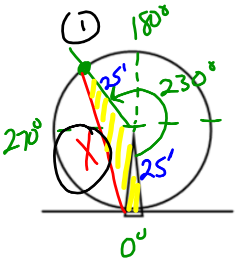
$c^2 = 36 + 49$

$c^2 = 85 \rightarrow \sqrt{c^2} = \sqrt{85}$, $c = \sqrt{85}$ always

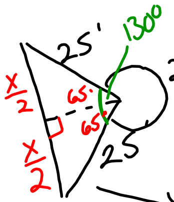
Application Word Problem:

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?

(1)



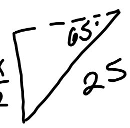
(2)



$230° \rightarrow 360 - 230 = 130°$

$130 \div 2 = 65°$

(3)



$\rightarrow \sin 65° = \frac{\frac{x}{2}}{25}$

$25 \sin 65° = \frac{x}{2}$

$22.657 = \frac{x}{2}$

$x = 2(22.657)$

$x \approx 45.3$ feet

Jan 6-9:05 PM