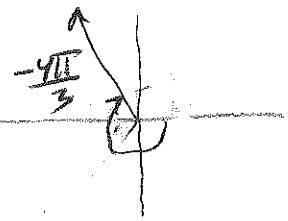
Sections 4.1 - 4.4 I.C.E Name: KEY

NO CALCULATOR! The quiz will also be ENTIRELY without a calculator!

For #1-4, sketch the angle in standard position. Find one positive and one negative coterminal angle:

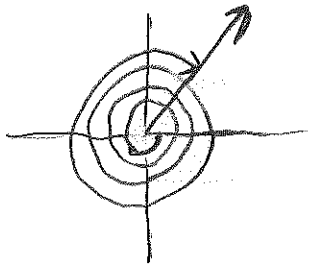
1) $\frac{-4\pi}{3}$ $+\frac{6\pi}{3}=\frac{2\pi}{3}$

$-\frac{6\pi}{3}=\frac{-12\pi}{3}$



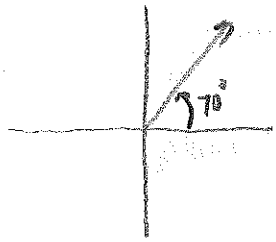
2) $\frac{-23\pi}{3}$ $+\frac{24\pi}{3}=\frac{\pi}{3}$

$+\frac{6\pi}{3}=\frac{-17\pi}{3}$



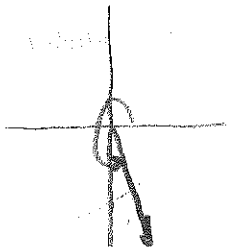
3) $70° + 360° = 430°$

$-360 = -290°$

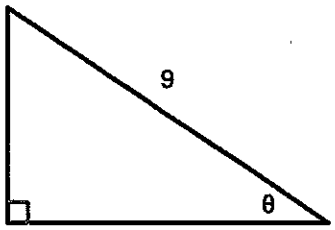


4) $280° + 360 = 640°$

$-360 = -80°$



5) Find the exact values of the six trig functions of the angle θ shown in the figure:



56
2 28
2 14
2 7
7 1

$\sqrt{81-25}=\sqrt{56}=2\sqrt{14}$

$\sin\theta=\frac{5}{9}$ $\cos\theta=\frac{2\sqrt{14}}{9}$

$\tan\theta=\frac{5}{2\sqrt{14}}=\frac{5\sqrt{14}}{28}$ $\cot\theta=\frac{2\sqrt{14}}{5}$

$\sec\theta=\frac{9}{2\sqrt{14}}=\frac{9\sqrt{14}}{28}$ $\csc\theta=\frac{9}{5}$

6) Use the given function value and trig identity to find the indicated trig functions:

$\csc\theta=4$

$\sin=\frac{1}{4}$

$\sqrt{16-1}=\sqrt{15}$

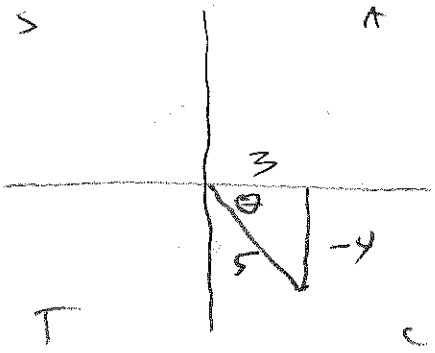
a) $\sin\theta=\frac{1}{4}$ b) $\cos\theta=\frac{\sqrt{15}}{4}$ c) $\sec\theta=\frac{4}{\sqrt{15}}=\frac{4\sqrt{15}}{15}$ d) $\tan\theta=\frac{1}{\sqrt{15}}=\frac{\sqrt{15}}{15}$

7) Find the EXACT values of the six trig functions of the angle θ (in standard position) whose terminal side passes through the point (3,-4)

$\sin\theta = -\frac{4}{5}$ $\cos\theta = \frac{3}{5}$

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

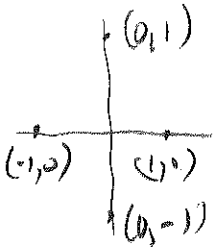
$\sec\theta = \frac{5}{3}$ $\csc\theta = -\frac{5}{4}$



8) Complete the following chart.

Write *undefined* where appropriate- it IS a possible answer:

θ	sinθ	cosθ	tanθ	cscθ	secθ	cotθ
0°	0	1	0	undef.	1	undef.
90°	1	0	undef.	1	undef.	0
180°	0	-1	0	undef.	-1	undef.
270°	-1	0	undef.	-1	undef.	0



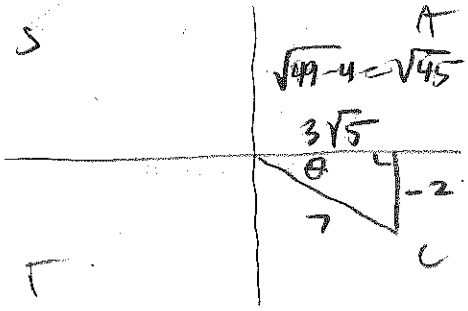
9) Find the five remaining trig functions of θ satisfying the condition:

$$\sin\theta = \frac{-2}{7}, \quad \cos\theta > 0$$

$\cot\theta = -\frac{3\sqrt{5}}{2}$ $\cos\theta = \frac{3\sqrt{5}}{7}$

$\tan\theta = -\frac{2}{3\sqrt{5}} = -\frac{2\sqrt{5}}{15}$ $\csc\theta = -\frac{7}{2}$

$\sec\theta = \frac{7}{3\sqrt{5}} = \frac{7\sqrt{5}}{15}$



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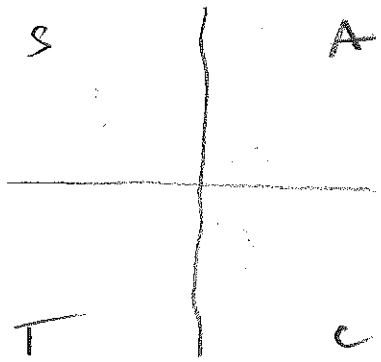
10) State which quadrant the terminal side of θ is in:

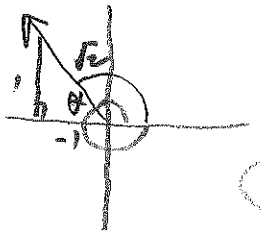
	Quadrant
$\sec\theta = \frac{6}{5}$, $\tan\theta < 0$	IV
$\csc\theta = \frac{3}{2}$, $\cos\theta < 0$	II
$\sin\theta = \frac{3}{8}$, $\cos\theta < 0$	II
$\tan\theta = \frac{5}{4}$, $\cos\theta < 0$	III
$\cos\theta = -\frac{2}{5}$, $\sin\theta > 0$	II



11) Evaluate the following **without a calculator**! - it may help to draw a picture

a) $\sin 495°$

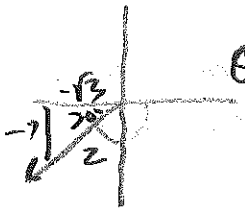
$495 - 360 = 135°$ $\quad 180 - 135 = 45°$



$\theta' = 45°$

$\sin 495° = \frac{\sqrt{2}}{2}$

b) $\cos(-150)° = -\frac{\sqrt{3}}{2}$

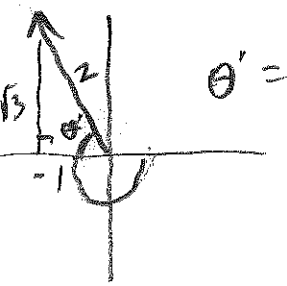


$\theta' = 30°$

c) $\tan\left(-\frac{4\pi}{3}\right) = -\sqrt{3}$

d) $\csc\left(\frac{7\pi}{4}\right) = -\sqrt{2}$

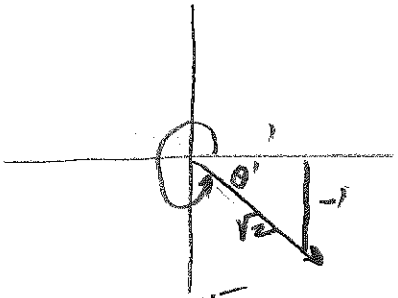
↳ $\sin = -\frac{1}{\sqrt{2}}$ ∴



$\theta' = 240 - 180 = 60°$

$-\frac{4\pi}{3} \cdot \frac{180}{\pi} = -240$

$\theta' = 360 - 315 = 45$



$\frac{7\pi}{4} \cdot \frac{180}{\pi} = 315°$

$\begin{array}{r} 45 \\ 7 \\ \hline 315 \end{array}$

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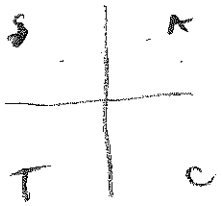
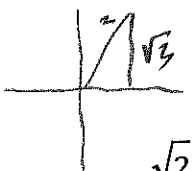


12) Find θ where $0° < \theta < 360°$

a) $\csc\theta = \frac{2\sqrt{3}}{3}$ and $\sec\theta > 0$

sin I, III

$\sin = \frac{2}{2\sqrt{3}} = \frac{\sqrt{3}}{2}$ cos



$\theta = 60°$

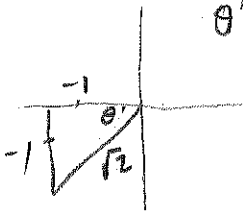
b) $\tan\theta = -1$ and $\sin\theta > 0$

I, II

$\theta = 135°$

$\theta' = 45°$

c) $\cos\theta = -\frac{\sqrt{2}}{2}$ and θ is in Quadrant III



$\theta = 180 + 45$

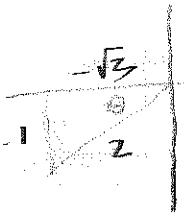
$= 225°$

d) $\cot\theta = \sqrt{3}$ and $\sin\theta < 0$

$\tan = \frac{1}{\sqrt{3}}$ III, IV

$\theta = 180 + 30$

$= 210°$



13) Use trigonometric identities to get the left side of the equation equal to the right side. You are only allowed to work on ONE side, so do not treat it like an equation

a) $\sin\theta \cdot \frac{1}{\csc\theta} + \cos\theta \cdot \frac{1}{\sec\theta} = 1$

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

$\sin^2\theta + \cos^2\theta = 1$ ✓

$1 = 1$ ✓

b) $2\tan\theta - \frac{\sin\theta}{\cos\theta} - \frac{1}{\cot\theta} = 0$

$2\tan\theta - \tan\theta - \tan\theta = 0$

$0 = 0$ ✓

c) $\sin^2 x - \cos^2 x = 2\sin^2 x - 1$ $\quad \cos^2 x = 1 - \sin^2 x$

$\sin^2 - (1 - \sin^2 x) = 2\sin^2 x - 1$

$\sin^2 - 1 + \sin^2 x = 2\sin^2 x - 1$

$2\sin^2 x - 1 = 2\sin^2 x - 1$ ✓

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d) $\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}=\csc\theta\sec\theta$

find common denominator:

$$\frac{\sin\theta\sin\theta}{\cos\theta\sin\theta}+\frac{\cos\theta\cos\theta}{\cos\theta\sin\theta}=\csc\theta\sec\theta$$

$$\frac{\sin^2\theta+\cos^2\theta}{\cos\theta\sin\theta}=\csc\theta\sec\theta$$

$$\frac{1}{\sin\theta\cos\theta}=\csc\theta\sec\theta$$

$$\left(\frac{1}{\sin\theta}\right)\left(\frac{1}{\cos\theta}\right)=\csc\theta\sec\theta$$

$$\csc\theta\sec\theta=\csc\theta\sec\theta \quad \checkmark$$