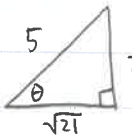
Problem Set 4

1. A) $\sin\theta = \frac{2}{5} = 0.4$



$x = \sqrt{5^2-2^2} = \sqrt{21}$

$\cos\theta = \frac{\sqrt{21}}{5}$

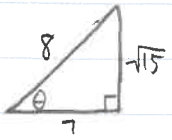
$\tan\theta = \frac{2}{\sqrt{21}} \cdot \frac{\sqrt{21}}{\sqrt{21}} = \frac{2\sqrt{21}}{21}$

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

$\sec\theta = \frac{5}{\sqrt{21}} \cdot \frac{\sqrt{21}}{\sqrt{21}} = \frac{5\sqrt{21}}{21}$

$\cot\theta = \frac{\sqrt{21}}{2}$

B) $\cos\theta = \frac{7}{8}$



$x = \sqrt{8^2-7^2} = \sqrt{64-49} = \sqrt{15}$

$\sin\theta = \frac{\sqrt{15}}{8}$

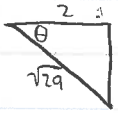
$\tan\theta = \frac{\sqrt{15}}{7}$

$\csc\theta = \frac{8}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}} = \frac{8\sqrt{15}}{15}$

$\sec\theta = \frac{8}{7}$

$\cot\theta = \frac{7}{\sqrt{15}} = \frac{7\sqrt{15}}{15}$

C) $\tan\theta = \frac{-5}{2}$



$x = \sqrt{5^2+2^2} = \sqrt{29}$

$\sin\theta = \frac{-5}{\sqrt{29}} = \frac{-5\sqrt{29}}{29}$

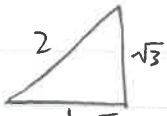
$\cos\theta = \frac{2}{\sqrt{29}} = \frac{2\sqrt{29}}{29}$

$\csc\theta = \frac{\sqrt{29}}{-5}$

$\sec\theta = \frac{\sqrt{29}}{2}$

$\cot\theta = \frac{2}{-5}$

D) $\sec\theta = 2$



$x = \sqrt{2^2-1^2} = \sqrt{3}$

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

$\cos\theta = \frac{1}{2}$

$\tan\theta = \frac{\sqrt{3}}{1} = \sqrt{3}$

$\csc\theta = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

$\cot\theta = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

2. $\sin(\theta^r) = \sin(\theta^\circ) \rightarrow \sin(\theta) = \sin\left(\theta \cdot \frac{\pi}{2} \cdot \frac{1}{100}\right) = \sin\left(\frac{\theta\pi}{200}\right)$

Case 1:

$\theta = \frac{\theta\pi}{200} + 2\pi n$

$\theta - 2\pi n = \theta\pi / 200$

$200\theta - 400\pi n = \theta\pi$

$200\theta - \theta\pi = 400\pi n$

$\theta(200-\pi) = 400\pi n$

$\theta = \frac{400\pi n}{200-\pi}$

Case 2:

$\theta + \frac{\theta\pi}{200} + 2\pi n = \pi$

$\theta\pi = 200(\pi - 2\pi n - \theta)$

$\theta\pi = 200\pi - 400\pi n - 200\theta$

$200\theta + \theta\pi = 200\pi - 400\pi n$

$\theta(200+\pi) = 200\pi - 400\pi n$

$\theta = \frac{200\pi - 400\pi n}{200+\pi}$

	Case 1	Case 2
IF $n=0$,	$\theta = 0$	$\theta = 0$
IF $n=1$,	$\theta = 6.38346$	$\theta = -3.09301$
IF $n=-1$,	$\theta = -6.3846$	$\theta = 3.09301$

Answer: $\theta = \frac{400\pi(1)}{200-\pi} = 6.38346$; $\theta = \frac{200\pi - 400\pi(-1)}{200+\pi} = 3.09301$