Name _____ Date _____ Class # _____ Block _____

Intro to Calculus

Workshop 19[1]

1. Match the following expressions with all of the letters on the diagram to which they correspond.

   i. $\cos(\alpha)=\frac{1}{2}$

   ii. $\cos(\alpha)=-\frac{\sqrt{3}}{2},\ \pi<\alpha\le 2\pi$

   iii. $\sin(\alpha)=\cos\left(\alpha+\frac{\pi}{2}\right),\ 0<\alpha\le\pi$

   iv. $\sin(\alpha)=-\frac{\sqrt{3}}{2}$

   v. $\sin\left(\alpha+\frac{\pi}{2}\right)=\cos\left(\alpha-\frac{\pi}{2}\right),\ 0\le\alpha<\pi$

   vi. $\cos(-\alpha)=\sin(\alpha+\pi)$

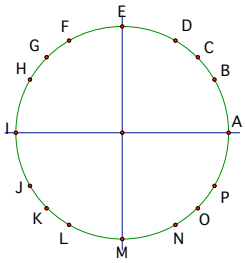

Diagram for problem 1

2. Let *P* represent the point of intersection of the terminal side of the central angle α (whose initial side is the positive *x*-axis) and the unit circle. Find **all** values for α which make each of the following true. Justify with a unit circle drawing.

   a. $P\left(\frac{-1}{2},\_\_\_\_\right)$ in $Q_{III},\ 0\le\alpha$

   b. $P\left(\frac{\sqrt{3}}{2},\_\_\_\_\right)$ in $Q_{IV},\ \alpha<0$

   c. $P\left(\frac{-\sqrt{3}}{2},\_\_\_\_\right)$ in $Q_{III},\ \alpha>0$

   d. $P\left(-\frac{\sqrt{2}}{2},\_\_\_\_\right)$ in $Q_{II},\ \alpha<0$

3. Simplify, without using your calculator. Justify with a unit circle drawing, Find all solutions.

   a. $\cos^{-1}\left(\cos\left(\frac{16\pi}{11}\right)\right)$

   b. $\sin^{-1}\left(\sin\left(\frac{13\pi}{5}\right)\right)$

[1] Based on work from Prof. Scott Farrand, CSUS Math 29B Workshop 25, 26 Spring 2005 and Unified Math 3, G. Rising

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4. Simplify the following. Justify with clear and complete work.

   a. $\dfrac{\tan^2(x)}{\cos(x)}+\sec(x)$ b. $\dfrac{\cos(\alpha)}{1+\sin(\alpha)}+\tan(\alpha)$ c. $\big(\csc(\alpha)-\cot(\alpha)\big)\big(\sec(\alpha)+1\big)$

5. Suppose that $\sin\alpha=-0.9$. Find each of the following with using a calculator. Justify with a unit circle drawing.

   a. What could be the value for $\sin\left[\alpha+\left(\dfrac{\pi}{2}\right)\right]$?

   b. What could be the value for $\cos\left[\alpha+\left(\dfrac{\pi}{2}\right)\right]$?

6. Suppose that $\cos\alpha=0.2$ and $\sin\alpha=0.979796$, find an angle λ (in terms of α) for which $\sin(\lambda)=0.2$ and $\cos(\lambda)=-0.979796$.

7. Without using your calculator, find all solutions for *t* such that $\sec^2(t)=\dfrac{4}{3}$.

8. Without using your calculator, find exact values for the variable between 0 and 2π for each of the following. Justify with clear and complete work. Verify your solutions with a graph (yea-- now use your calculator).

   a. $\tan(\theta)=\sqrt{3}$ b. $\cos(\alpha)+2=3\cos(\alpha)$ c. $2\sin(\theta)+5=4\sin(\theta)+6$

   d. $3\cot^2(\theta)=1$ e. $3\sec(\theta)=-2\sqrt{3}$

9. Find exact numerical values for the following without using your calculator.

   a. $\log_5\left(125\sqrt{5}\right)$ b. $\log_{\left(\frac{1}{8}\right)}(16)$ c. $\log_{\sqrt{b}}\left(\sqrt[3]{b^2}\right)$

   d. $\log_{\left(\frac{1}{9}\right)}\left(\dfrac{27}{\sqrt{3}}\right)$ e. $\log_{\left(\frac{1}{\sqrt{b}}\right)}\left(b^3\right)$ f. $\ln\left(\left(\sqrt{e}\right)^{\ln\left(e^2\right)}\right)$

10. Solve for *x*:

    a. $\log_x\left(2x^3+x^2-16\right)=2$ b. $\log_3\left(x^2+4x+1\right)-\log_3\left(x^2-5\right)=1$