Pre Calculus
8.1,8.2,8.7,8.8 Test Review

Name: KEY
Period: ________ Date: ________

Evaluate each expression. Give exact answers! Keep any angle measures in radians.

1. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ 0 to π

$x = -\frac{\sqrt{3}}{2}$?

$\theta = \frac{5\pi}{6}$

2. $\csc^{-1}\left(\sqrt{2}\right)$ from $-\frac{\pi}{2}$ $\frac{\pi}{2}$

$\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)\cdot\frac{\sqrt{2}}{\sqrt{2}}$

$\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

$\theta = \frac{\pi}{4}$

3. $\tan^{-1}(-1)$ $-\frac{\pi}{2}$ to $\frac{\pi}{2}$

$\frac{y}{x} = -1$?

at $\frac{3\pi}{4}$ $\cancel{\frac{7\pi}{4}}$

$\theta = -\frac{\pi}{4}$ not $\frac{7\pi}{4}$

4. $\sin\left(\frac{5\pi}{6}\right)$

y-value at $\frac{5\pi}{6}$

$\frac{1}{2}$

5. $\cos^{-1}(-4)$ Not on unit circle!

$1^2 = (-4)^2 + y^2$

$1 = 16 + y^2$

$\sqrt{-15} = \sqrt{y^2}$

Undefined

6. $\sec^{-1}(2)$

$\cos^{-1}\left(\frac{1}{2}\right)$

$x = \frac{1}{2}$?

$\theta = \frac{\pi}{3}$

7. $\sec\left(\cos^{-1}\left(\frac{1}{2}\right)\right)$

$\sec\left(\frac{\pi}{3}\right)$

flip $\cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$

2

8. $\csc\left(\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right)$

$\csc\left(\frac{5\pi}{6}\right)$ flip sin

$\sin\left(\frac{5\pi}{6}\right) = \frac{1}{2}$

2

9. $\sec\left(\tan^{-1}\left(\sqrt{3}\right)\right)$

$\sec\left(\frac{\pi}{3}\right)$ flip cos

$\cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$

2

10. $\csc\left(\cos^{-1}\left(-\frac{3}{8}\right)\right)$ not on unit circle!

$\csc(\theta)$

sin

$\frac{8}{\sqrt{55}}\cdot\frac{\sqrt{55}}{\sqrt{55}}$

$64 = 9 + y^2$

$\sqrt{55} = \sqrt{y^2}$

$\frac{8\sqrt{55}}{55}$

11. $\cot\left(\cos^{-1}\left(-\frac{\sqrt{3}}{3}\right)\right)$

$\cot(\theta)$

$3^2 = (-\sqrt{3})^2 + y^2$

$9 = 3 + y^2$

$6 = y^2$

$= -\frac{\sqrt{3}}{\sqrt{6}}\cdot\frac{\sqrt{6}}{\sqrt{6}}$ $\sqrt{3\cdot 2}$

$\cancel{-\frac{3\sqrt{2}}{6}}$ $-\frac{\sqrt{2}}{2}$

$\sqrt{18} = 3\sqrt{2}$

$\sqrt{9}\,\sqrt{2}$

12. $\csc\left(\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)\right) + \cot\left(\tan^{-1}(1)\right)$

$\csc\left(\frac{\pi}{6}\right) + \cot\left(\frac{\pi}{4}\right) \rightarrow$ flip

$\frac{2}{1} + 1$ $\tan\frac{\pi}{4} = \frac{1}{1}$

3

13. $\sin^{-1}\left(\cos\left(\frac{3\pi}{4}\right)\right) + \cos^{-1}\left(\sin\left(-\frac{\pi}{4}\right)\right)$

$\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) + \cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

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

$\frac{\pi}{2}$

Solve the equation. Give the general formula for <u>all</u> solutions! Show all work! Circle final answers!

14. $6\tan\theta + 13 = 19$

$-13 \quad -13$

$\frac{6\tan\theta}{6} = \frac{6}{6}$

$\tan\theta = 1$

$\theta = \left\{\frac{\pi}{4}, \frac{5\pi}{4}\right\} \pm \pi k$

15. $\sin(2\theta) - \frac{\sqrt{3}}{2} = 0$

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

$\frac{1}{2} \cdot 2\theta = \left\{\frac{\pi}{3} \cdot \frac{1}{2}, \frac{2\pi}{3} \cdot \frac{1}{2}\right\} \pm \cancel{2}\pi k \cdot \frac{1}{\cancel{2}}$

$\frac{2\pi}{6} = \frac{\pi}{3}$

$\boxed{\theta = \left\{\frac{\pi}{6}, \frac{\pi}{3}, \frac{7\pi}{6}, \frac{4\pi}{3}\right\} \pm \pi k}$

$+\frac{6\pi}{6} \quad +\frac{3\pi}{3}$

Solve the equation over the interval $0 \le \theta < 2\pi$. Give exact answers, show all work, and circle final answers!

18. $2\sin(2\theta) = -\sqrt{3}$

$\frac{2\sin(2\theta)}{2} = \frac{-\sqrt{3}}{2}$

$\sin(2\theta) = -\frac{\sqrt{3}}{2}$

$\frac{1}{2} \cdot 2\theta = \left\{\frac{4\pi}{3} \cdot \frac{1}{2}, \frac{5\pi}{3} \cdot \frac{1}{2}\right\} \pm 2\pi k \cdot \frac{1}{2}$

$\theta = \left\{\frac{4\pi}{6}, \frac{5\pi}{6}, \frac{10\pi}{6}, \frac{11\pi}{6}\right\} \pm \pi k$

$+\frac{6\pi}{6} \quad +\frac{6\pi}{6}$

$\boxed{\theta = \left\{\frac{2\pi}{3}, \frac{5\pi}{6}, \frac{5\pi}{3}, \frac{11\pi}{6}\right\}}$

19. $2\cos^2\theta + 9\cos\theta - 5 = 0$

$2x^2 + 9x - 5 = 0$

$(2\cos\theta - 1)(\cos\theta + 5) = 0$

$2\cos\theta - 1 = 0$

$+1 \quad +1$

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

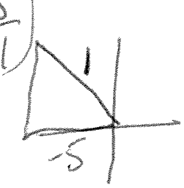
$x = \frac{1}{2}?$

$\theta = \left\{\frac{\pi}{3}, \frac{5\pi}{3}\right\}$

$\cos\theta + 5 = 0$

$\cos\theta = \frac{-5}{1}$

NOT ON UNIT Circle



$1^2 = (-5)^2 + y^2$

$1 = 25 + y^2$

$\sqrt{-24} = \sqrt{y^2}$

undefined

20. $\sin(2\theta) = -\cos\theta$ → 2 trig functions

$2\sin\theta\cos\theta = -\cos\theta$

$+\cos\theta \quad +\cos\theta$

$2\sin\theta\cos\theta + \cos\theta = 0$

to factor, need equation equal to 0!

$\cos\theta(2\sin\theta + 1) = 0$

can't divide by $\cos\theta$!

$\cos\theta = 0 \qquad 2\sin\theta + 1 = 0$

$-1 \quad -1$

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

$\boxed{\theta = \left\{\frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}}$