# Math 130 - Quiz 4

September 30, 2020

Name: Key

Score

Show all work to receive full credit. Supply explanations when necessary. You must work individually on this quiz. This quiz is due October 5.

1. (3 points) On the attached graph paper, carefully graph two full periods. Label your axes.

$$y = 1 + 2\csc(2x)$$

SEE ATTACHED SHEET.

2. (2 points) Determine the exact values of each of the following. Do not use a calculator.

(a) $\sin^{-1}\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$ BECAUSE $\sin\left(-\frac{\pi}{6}\right) = -\frac{1}{2}$

(b) $\arctan(1) = \boxed{\frac{\pi}{4}}$ BECAUSE $\tan\left(\frac{\pi}{4}\right) = 1$

(c) $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$ BECAUSE $\cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$

(d) $\arccos(-1) = \boxed{\pi}$ BECAUSE $\cos \pi = -1$

3. (1 point) Without your calculator, determine the value of $\cos^{-1}(\cos 7\pi)$. Explain or show work.

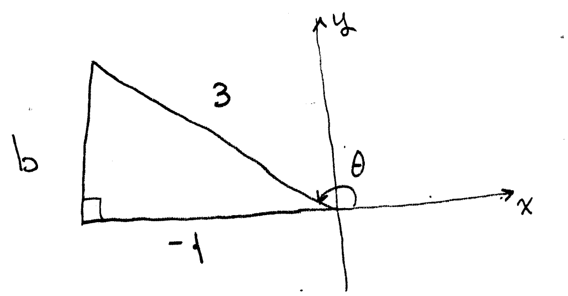
$$\cos^{-1}(\cos 7\pi) = \cos^{-1}(\cos 5\pi) = \cos^{-1}(\cos 3\pi)$$

$$= \cos^{-1}(\cos \pi) = \boxed{\pi}$$

( SUBTRACT PERIODS UNTIL WE ARE IN THE RIGHT RANGE OF ANGLES. )

4. (2 points) Use a right triangle to find the exact value of $\sin[\cos^{-1}(-1/3)]$.

$$\cos^{-1}\left(-\tfrac{1}{3}\right) = \theta$$




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

$$\sin\left(\cos^{-1}\left(-\tfrac{1}{3}\right)\right) = \frac{2\sqrt{2}}{3}$$

$$3^2 = (-1)^2 + b^2$$

$$b = \sqrt{8} = 2\sqrt{2}$$

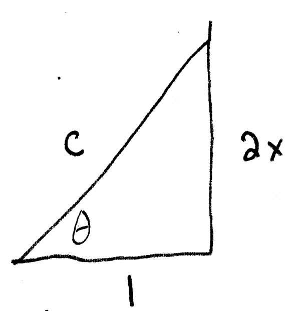
5. (2 points) Use a right traingle to determine an algebraic expression for $\csc[\tan^{-1}(2x)]$.

$$\tan^{-1}(2x) = \theta$$

$$\tan\theta = \frac{2x}{1}$$

$$\csc\theta = \frac{1}{\sin\theta} = \frac{\sqrt{1+4x^2}}{2x}$$

$$\Downarrow$$




$$\csc\left(\tan^{-1}(2x)\right) = \frac{\sqrt{1+4x^2}}{2x}$$

$$c^2 = 1^2 + (2x)^2$$

$$= 1 + 4x^2 \Rightarrow c = \sqrt{1+4x^2}$$

#1

$y = 1 + 2\csc(2x)$

WE START BY GRAPHING $y = 1 + 2\sin(2x)$

AMPLITUDE = 2
PERIOD = $\pi$
MIDLINE: $y = 1$

PLACE VERTICAL ASYMPTOTES WHERE $2\sin(2x) = 0$