Math 51 (9:30am – 10:20am)
Quiz 6
Fri May 29, 2009

SCORE: ___ / 20 POINTS

What month is your birthday ? ___ ___
What are the first 2 digits of your address ? ___ ___
What are the last 2 digits of your zip code ? ___ ___
What are the last 2 digits of your social security number ? ___ ___
[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER, USE YOUR STUDENT ID NUMBER]

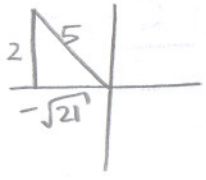
NO CALCULATORS ALLOWED

Write $\tan\left(\frac{\pi}{4}+x\right)$ as an expression involving trigonometric functions of x. **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.

$$\frac{\tan\frac{\pi}{4}+\tan x}{1-\tan\frac{\pi}{4}\tan x}=\frac{1+\tan x}{1-\tan x}$$

If $\sin\theta=\frac{2}{5}$, and $\cos\theta<0$, find $\sin 2\theta$. **SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.** **SCORE: ___ / 3 POINTS**



$$2\sin\theta\cos\theta$$
$$=2\left(\frac{2}{5}\right)\left(-\frac{\sqrt{21}}{5}\right)$$
$$=-\frac{4\sqrt{21}}{25}$$

Find the exact value of $\sin 40^\circ\sin 50^\circ-\cos 40^\circ\cos 50^\circ$. **SCORE: ___ / 2 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.

$$-(\cos 40^\circ\cos 50^\circ-\sin 40^\circ\sin 50^\circ)$$
$$=-\cos(40^\circ+50^\circ)$$
$$=-\cos 90^\circ$$
$$=-0$$
$$=0$$

Find the exact value of $\tan\frac{\pi}{12}$. **SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.** **SCORE: ___ / 4 POINTS**

$$\tan\left(\frac{\pi}{3}-\frac{\pi}{4}\right)=\frac{\tan\frac{\pi}{3}-\tan\frac{\pi}{4}}{1+\tan\frac{\pi}{3}\tan\frac{\pi}{4}}$$

$$=\frac{\sqrt{3}-1}{1+\sqrt{3}}\cdot\frac{1-\sqrt{3}}{1-\sqrt{3}}$$

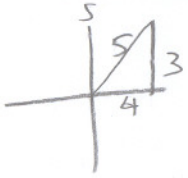
$$=\frac{\sqrt{3}-3-1+\sqrt{3}}{1-3}$$

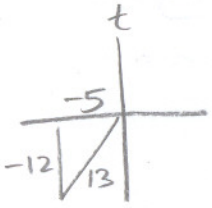
$$=\frac{2\sqrt{3}-4}{-2}$$

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

If $\sin s=\frac{3}{5}$, and $\sin t=-\frac{12}{13}$, and s is in the 1st quadrant, and t is in the 3rd quadrant, find $\cos(s-t)$. **SCORE: ___ / 4 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.





$$\cos s\cos t+\sin s\sin t$$

$$=\left(\frac{4}{5}\right)\left(\frac{-5}{13}\right)+\left(\frac{3}{5}\right)\left(\frac{-12}{13}\right)$$

$$=\frac{-56}{65}$$

If $\cos 2\theta=\frac{3}{5}$, and θ is in the 3rd quadrant, find $\csc\theta$. **SCORE: ___ / 4 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.

$$1-2\sin^2\theta=\frac{3}{5}$$

$$-2\sin^2\theta=\frac{-2}{5}$$

$$\sin^2\theta=\frac{1}{5}$$

$$\sin\theta=\pm\frac{1}{\sqrt{5}}=-\frac{1}{\sqrt{5}}\longrightarrow\csc\theta=\frac{1}{\sin\theta}=-\sqrt{5}$$

θ in Q_3

$\sin\theta<0$