M17_LE4_003

Mathematics 17 — College Algebra and Trigonometry
Fourth Long Examination — First Semester, AY 2011-2012

I. Write TRUE if the statement is correct, otherwise, write FALSE. *1 point each*

1. The amplitude of $f(x)=\frac{1}{2\sec x}$ is 2.
2. If $\cos\theta>0$ and $\csc\theta<0$ then $P(\theta)\in QII$.
3. The function $g(x)=\tan(\cos x)$ is odd.
4. $\sin\left(\frac{3\pi}{5}\right)=\cos\left(\frac{-\pi}{10}\right)$.
5. $\frac{5}{8}$ rev is coterminal with $-\frac{3\pi}{4}$ rad.

II. Do as indicated. *3 points each*

1. Evaluate $\tan^2\frac{\pi}{12}+\csc^2\frac{\pi}{3}-\sec^2\frac{\pi}{12}$.
2. Find the distance travelled by the tip of a 5-inch hour hand after 2 hours and 30 minutes.
3. Find the domain and range of the function $f(x)=3\csc(2x)$.
4. The terminal side of angle α passes through the point (5,-12). Find the 6 trigonometric values of angle α.

III. Suppose $\cos\alpha=\frac{-1}{\sqrt{10}}$ and $\tan\alpha<0$ and $\cot\beta=-2$ with $P(\beta)\in QIV$. Evaluate the following.

1. $\sin(2\alpha)$
2. $\tan\left(\frac{\beta}{2}\right)$
3. $\cos(\alpha+\beta)$

IV. Prove the following identities. *4 points each*

1. $\frac{\sec\theta-\csc\theta}{\cot\theta-1}=-\sec\theta$
2. $\frac{\sin^3\theta-\cos^3\theta}{\sin\theta-\cos\theta}-\frac{\tan\theta}{\sec^2\theta}=1$

V. Let $f(x)=-2\cos\left(\frac{\pi x}{2}+\frac{\pi}{2}\right)$. *3 points each*

1. Identify the domain, range, amplitude, period, phase shift, vertical shift of *f*.
2. Sketch the graph of at least one period of *f*.

END OF EXAM