Exam III a Fall 2013 Sections 7.1–7.7, 8.1–8.5 TA

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the exact value of the expression.

1) $\cos^{-1}(-1)$ 1) _____

A) 0 B) 2π C) π D) $\frac{\pi}{2}$

2) $\sec\left[\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right]$ 2) _____

A) 0 B) 2 C) $\frac{\sqrt{2}}{2}$ D) 1

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the equation on the interval $0 \le \theta < 2\pi$. Show Work.

3) $2\sin^2(3\theta) + 9\sin(3\theta) + 4 = 0$ 3) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the exact value of the expression. Show Work

4) $\sin\left(-\frac{11\pi}{12}\right)$ 4) _____

A) $\frac{\sqrt{6}-\sqrt{2}}{4}$ B) $\frac{\sqrt{2}-\sqrt{6}}{4}$ C) $\frac{\sqrt{2}+\sqrt{6}}{4}$ D) $-\frac{\sqrt{6}+\sqrt{2}}{4}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Establish the identity.

5) $(\sin x)(\tan x \cos x - \cot x \cos x) = 1 - 2\cos^2 x$ 5) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use the information given about the angle θ, $0 \le \theta \le 2\pi$, to find the exact value of the indicated trigonometric function.

6) $\sin\theta = -\frac{\sqrt{5}}{5}$, $\frac{3\pi}{2} < \theta < 2\pi$ Find $\cos\frac{\theta}{2}$. Show Work 6) _____

A) $-\sqrt{\frac{5+2\sqrt{5}}{10}}$ B) $-\sqrt{\frac{5-2\sqrt{5}}{10}}$ C) $\sqrt{\frac{5+2\sqrt{5}}{10}}$ D) $\sqrt{\frac{5-2\sqrt{5}}{10}}$

Express the product as a sum containing only sines or cosines.

7) $\cos(5\theta)\cos(4\theta)$ 7) _____

A) $\cos^2(20\theta^2)$

B) $\frac{1}{2}[\cos(9\theta) - \cos\theta]$

C) $\frac{1}{2}[\cos(9\theta) - \sin\theta]$

D) $\frac{1}{2}[\cos\theta + \cos(9\theta)]$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

8) A straight trail with a uniform inclination of 21° leads from a lodge at an elevation of 1000 feet to a mountain lake at an elevation of 9800 feet. What is the length of the trail (to the nearest foot)? Show Work 8) _____

Two sides and an angle are given. Determine whether the given information results in one triangle, two triangles, or no triangle at all. Solve any triangle(s) that results. If no triangle exists state so. Show Work both 9 and 10.

9) b =9.5 c = 9, B = 70°

9) _____

Solve the triangle.

10) a = 9, b = 6, C = 70°

10) _____

Formula Sheet Math 121 Fall 2013 Exam 3

Fundamental Identities:

$1+\tan^2\theta=\sec^2\theta$ $\quad 1+\cot^2\theta=\csc^2\theta$

Law of Sines: $\frac{\sin A}{a}=\frac{\sin B}{b}=\frac{\sin C}{c}$

Law of Cosines:

$a^2=b^2+c^2-2bc\cos A$ $\quad b^2=a^2+c^2-2ac\cos B$ $\quad c^2=a^2+b^2-2ab\cos C$

Addition subtraction formulas:

$\sin(x+y)=\sin x\cos y+\cos x\sin y$ $\quad \sin(x-y)=\sin x\cos y-\cos x\sin y$

$\cos(x+y)=\cos x\cos y-\sin x\sin y$ $\quad \cos(x-y)=\cos x\cos y+\sin x\sin y$

Product Formulas:

$\sin x\cos y=\frac{1}{2}[\sin(x+y)+\sin(x-y)]$ $\quad \cos x\cos y=\frac{1}{2}[\cos(x+y)+\cos(x-y)]$

$\sin x\sin y=\frac{1}{2}[\cos(x-y)-\cos(x+y)]$

Half Angle formulas:

$\cos\left(\frac{x}{2}\right)=\pm\sqrt{\frac{1+\cos x}{2}}$ $\quad \sin\left(\frac{x}{2}\right)=\pm\sqrt{\frac{1-\cos x}{2}}$ $\quad \tan\left(\frac{x}{2}\right)=\pm\sqrt{\frac{1-\cos x}{1+\cos x}}$

Double angle : $\sin(2\theta)=2\sin\theta\cos\theta$

$\cos(2\theta)=\cos^2\theta-\sin^2\theta=1-2\sin^2\theta=2\cos^2\theta-1$

Sum to Product Formulas:

$\sin\alpha+\sin\beta=2\sin\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha-\beta}{2}\right)$ $\quad \sin\alpha-\sin\beta=2\sin\left(\frac{\alpha-\beta}{2}\right)\cos\left(\frac{\alpha+\beta}{2}\right)$

$\cos\alpha+\cos\beta=2\cos\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha-\beta}{2}\right)$ $\quad \cos\alpha-\cos\beta=-2\sin\left(\frac{\alpha+\beta}{2}\right)\sin\left(\frac{\alpha-\beta}{2}\right)$

Area of a Triangle: Area$=\frac{1}{2}ab\sin C=\frac{1}{2}ac\sin B=\frac{1}{2}bc\sin A$

$s=\frac{1}{2}(a+b+c)$ Area$=\sqrt{s(s-a)(s-b)(s-c)}$