Math 1316 - Practice Exam 3 - Spring 19

MULTIPLE CHOICE SECTION. (5 pts each) Choose the correct answer for each question. Select one choice only. No work will be graded. No partial credit.

Use the fundamental identities to find the value of the trigonometric function.

1) Find csc θ if cot θ = $-\sqrt{15}$ and θ is in quadrant II. 1) _____

A) $\frac{1}{4}$ B) $-\frac{1}{4}$ C) -4 D) 4

Complete the sentence so the result is an identity. Let x be any real number.

2) ___ $- 1 = \tan^2 x$ 2) _____

A) $\sec^2 x$ B) $\cos^2 x$ C) $\sin^2 x$ D) $\cot^2 x$

3) $\frac{\sin x}{\tan x} =$ ___ 3) _____

A) cot x B) sec x C) csc x D) cos x

Perform the indicated operations and simplify the result so there are no quotients.

4) $\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}$ 4) _____

A) $-2\tan^2\theta$ B) $1 + \cot\theta$ C) $\sec\theta \csc\theta$ D) $\sin\theta \tan\theta$

Use identities to write each expression as a function of θ.

5) $\cos\left(\theta + \frac{\pi}{2}\right)$ 5) _____

A) $\sin\theta$ B) $-\cos\theta$ C) $-\sin\theta$ D) $\cos\theta$

Find the exact value of the expression using the provided information.

6) Find cos(s – t) given that cos s = $-\frac{1}{2}$, with s in quadrant III, and cos t = $-\frac{3}{5}$, with t in quadrant III. 6) _____

A) $\frac{-3+4\sqrt{3}}{10}$ B) $\frac{3-4\sqrt{5}}{10}$ C) $\frac{3+4\sqrt{3}}{10}$ D) $\frac{3-4\sqrt{3}}{10}$

7) Find tan(s + t) given that cos s = $-\frac{5}{13}$, with s in quadrant II, and sin t = $\frac{8}{17}$, with t in quadrant II. 7) _____

A) $\frac{20}{3}$ B) $-\frac{220}{171}$ C) $-\frac{220}{221}$ D) $\frac{220}{21}$

Using a sum or difference identity, write the following as an expression involving functions of x.

8) $\sin\left(\frac{\pi}{4} - x\right)$ 8) _____

A) $-\cos x$ B) $\frac{\sqrt{2}}{2}\cos x - \frac{\sqrt{2}}{2}\sin x$

C) $\frac{\sqrt{2}}{2}\cos x + \frac{\sqrt{2}}{2}\sin x$ D) $\sin x$

Use identities to find the indicated value for each angle measure.

9) $\sin\theta = \frac{12}{13}$, $\cos\theta > 0$ Find $\cos(2\theta)$. 9) _____

A) $\frac{120}{169}$ B) $\frac{119}{169}$ C) $-\frac{121}{169}$ D) $-\frac{119}{169}$

Use an identity to write the expression as a single trigonometric function or as a single number.

10) $4 \sin 2x \cos 2x$ 10) _____

A) $\cos 4x$ B) $2 \sin 4x$ C) $\frac{1}{2}\sin 16x$ D) $\cos 8x$

Determine all solutions of the equation in radians.

11) Find $\cos\frac{\theta}{2}$, given that $\sin\theta = \frac{1}{4}$ and θ terminates in $0 < \theta < 90°$. 11) _____

A) $\frac{\sqrt{6}}{4}$ B) $\frac{\sqrt{8+2\sqrt{15}}}{4}$ C) $\frac{\sqrt{8-2\sqrt{15}}}{4}$ D) $\frac{\sqrt{10}}{4}$

Use an identity to write the expression as a single trigonometric function or as a single number.

12) $\frac{\sin 52°}{1+\cos 52°}$ 12) _____

A) $\cot 26°$ B) $\tan 26°$ C) $\cos 26°$ D) $\sin 26°$

SHORT ANSWER SECTION. (5 pts each) Write the answer in the box. Write the FINAL ANSWER ONLY. No work will be graded. No partial credit.

Use the fundamental identities to find the value of the trigonometric function.

13) Find $\sin\theta$ if $\cot\theta = -2$ and $\cos\theta < 0$. 13) _____

Use Identities to find the exact value. (Give exact answer, i.e., NO DECIMALS)

14) $\cos\frac{7\pi}{12}\cos\frac{5\pi}{12} + \sin\frac{7\pi}{12}\sin\frac{5\pi}{12}$ 14) _____

Using a sum or difference identity, write the following as an expression involving functions of x.

15) $\tan\left(x - \frac{\pi}{3}\right)$ 15) _____

Find the exact value of the expression using the provided information.

16) Find $\sin(s - t)$ given that $\sin s = -\frac{1}{2}$, with s in quadrant IV, and $\sin t = \frac{1}{4}$, with t in quadrant II. 16) _____

Use an identity to write the expression as a single trigonometric function.

17) $\cos^2 4x - \sin^2 4x$ 17) _____

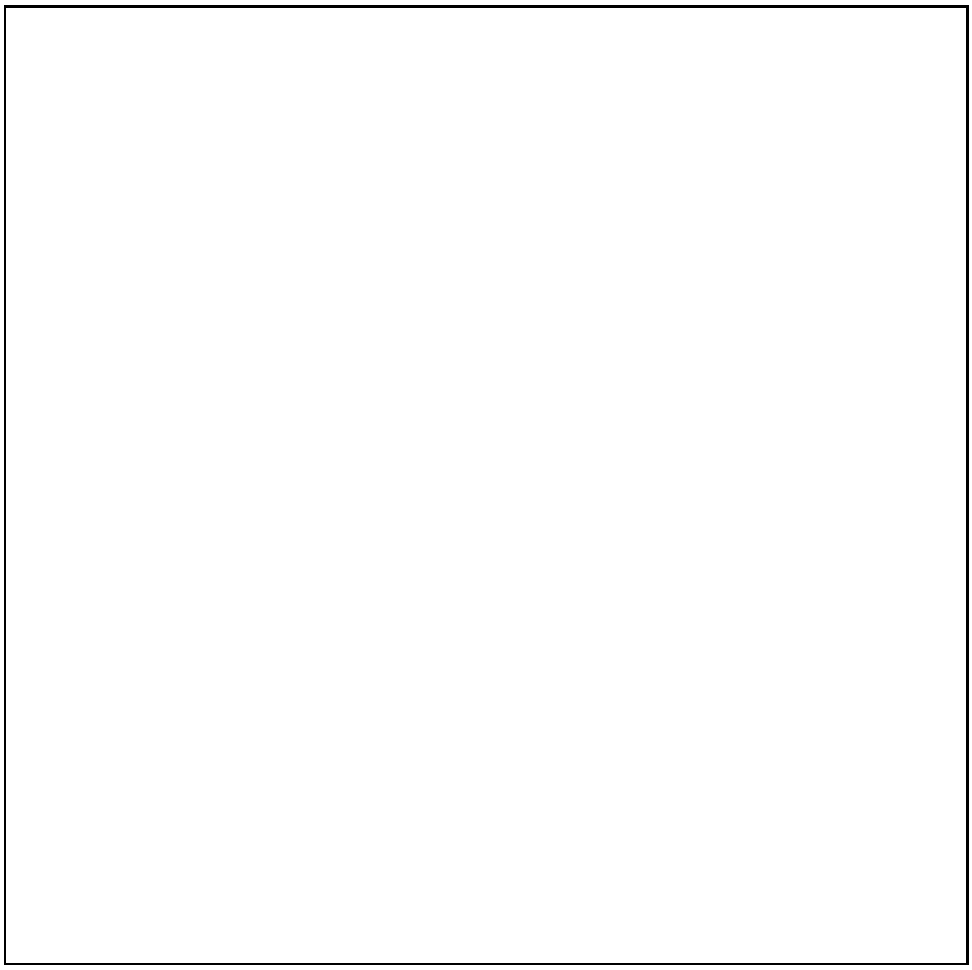
Use an identity to write the expression as a single trigonometric function or as a single number.

18) $\sqrt{\frac{1 + \cos 26°}{2}}$ 18) _____

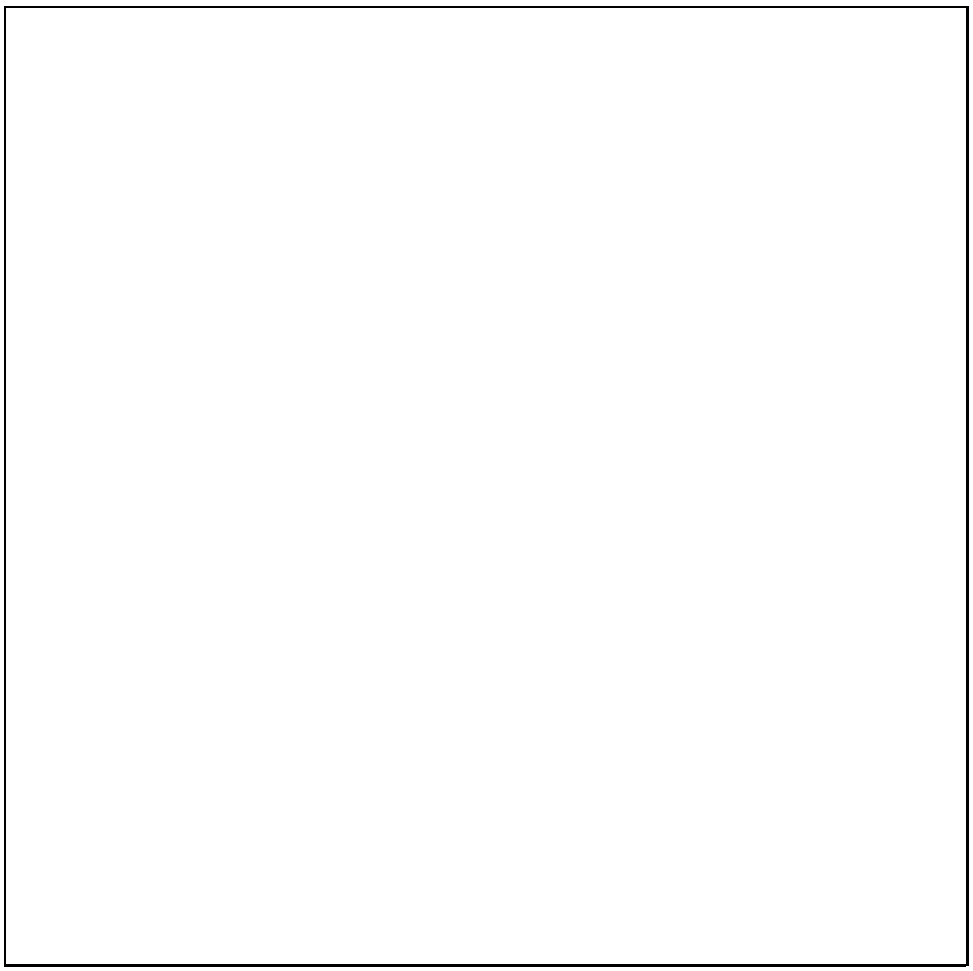
ESSAY. (5 pts each) Show all work to justify your answer. Answer with no work or insufficient work will receive no credit. Partial credit may be given.

Verify that each equation is an identity.

19) $\dfrac{1-\sec\theta}{\tan\theta}+\dfrac{\tan\theta}{1-\sec\theta}=-2\csc\theta$



20) $\cos(4\theta) = \cos^4\theta - 6\sin^2\theta\cos^2\theta + \sin^4\theta$



1) D
2) A
3) D
4) C
5) C
6) C
7) D
8) B
9) D
10) B
11) B
12) B
13) $\frac{\sqrt{5}}{5}$
14) $\frac{\sqrt{3}}{2}$
15) $\frac{\tan x - \sqrt{3}}{1 + \sqrt{3}\tan x}$
16) $\frac{\sqrt{15} - \sqrt{3}}{8}$
17) cos 8x
18) cos 13°
19) $\frac{1 - \sec\theta}{\tan\theta} + \frac{\tan\theta}{1 - \sec\theta} = \frac{(1 - \sec\theta)^2 + \tan^2\theta}{\tan\theta(1 - \sec\theta)} = \frac{1 - 2\sec\theta + \sec^2\theta + \tan^2\theta}{\tan\theta(1 - \sec\theta)} = \frac{2\sec^2\theta - 2\sec\theta}{\tan\theta(1 - \sec\theta)} = \frac{2\sec\theta(\sec\theta - 1)}{\tan\theta(1 - \sec\theta)} = -\frac{2\sec\theta}{\tan\theta} = -\frac{2}{\cos\theta} \cdot \frac{\cos\theta}{\sin\theta} = -\frac{2}{\sin\theta} = -2\csc\theta$
20) $\cos(4\theta) = \cos[2(2\theta)] = \cos^2(2\theta) - \sin^2(2\theta) = (\cos^2\theta - \sin^2\theta)^2 - (2\sin\theta\cos\theta)^2 = \cos^4\theta - 2\sin^2\theta\cos^2\theta + \sin^4\theta - 4\sin^2\theta\cos^2\theta = \cos^4\theta - 6\sin^2\theta\cos^2\theta + \sin^4\theta$