MAC 1114 Review for Exam 3

Name_____ Date: _____

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

1) Find tan s if $\sin s = \frac{3}{4}$ and s is in quadrant II.

A) $-\frac{\sqrt{7}}{9}$ B) $-\frac{3}{2}$ C) $\frac{5}{4}$ D) $-\frac{3\sqrt{7}}{7}$

2) Find cos θ if $\tan \theta = 3$ and $\sin \theta < 0$.

A) $-\frac{\sqrt{10}}{10}$ B) $\frac{1}{3}$ C) -10 D) $-\frac{\sqrt{10}}{3}$

3) Find sin s if $\sec s = -\frac{8}{5}$ and $\tan s < 0$.

A) $\frac{\sqrt{39}}{8}$ B) $\frac{39}{64}$ C) $-\frac{5}{8}$ D) $-\frac{\sqrt{39}}{8}$

Use the fundamental identities to find an equivalent expression involving only sines and cosines, and then simplify it.

4) $\frac{\sec \theta \csc \theta}{\tan \theta \cot \theta}$

A) $\frac{1}{\sin \theta \cos \theta}$ B) $\cos \theta - \sin \theta$ C) $\frac{1}{\sin \theta \cos^2 \theta}$ D) $\frac{\sin \theta + \cos \theta}{\sin \theta \cos \theta}$

Perform the indicated operations and simplify the result.

5) $\sec \theta - \frac{1}{\sec \theta}$

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

6) $\frac{\sin \theta}{1 + \sin \theta} - \frac{\sin \theta}{1 - \sin \theta}$

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

7) $\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta}$

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

Use the fundamental identities to simplify the expression.

8) $\frac{1}{\cot^2 \theta} + \sec \theta \cos \theta$

A) 1 B) $\tan^2 \theta$ C) $\sec^2 \theta$ D) $\csc^2 \theta$

Simplify the expression.

9) $\cos(-x) \cos x - \sin(-x) \sin x$

A) 2 B) $\cos^2 x \sin^2 x$ C) 0 D) 1

10) $\frac{\sec^2 x}{\tan x} - \tan x$

A) csc x B) cot x C) tan x D) $\tan^2 x$

Use an appropriate identity to find the exact value of the expression.

11) sin (165°)

A) $\frac{-\sqrt{2}(\sqrt{3}-1)}{4}$ B) $\frac{-\sqrt{2}(\sqrt{3}+1)}{4}$ C) $\frac{\sqrt{2}(\sqrt{3}-1)}{4}$ D) $\frac{\sqrt{2}(\sqrt{3}+1)}{4}$

12) cos (−165°)

A) $\frac{\sqrt{2}(1+\sqrt{3})}{4}$ B) $\frac{\sqrt{2}(1-\sqrt{3})}{4}$ C) $\frac{\sqrt{2}(\sqrt{3}-1)}{4}$ D) $\frac{-\sqrt{2}(\sqrt{3}+1)}{4}$

Find the exact value by using a sum or difference identity.

13) $\cos\frac{\pi}{5}\cos\frac{2\pi}{15} - \sin\frac{\pi}{5}\sin\frac{2\pi}{15}$

A) $\frac{\sqrt{2}}{2}$ B) $\frac{1}{2}$ C) 1 D) $\frac{\sqrt{3}}{2}$

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

A) $\frac{1}{2}$ B) − 1 C) $\frac{\sqrt{2}}{2}$ D) $\frac{\sqrt{3}}{2}$

15) sin (20°) cos (100°) + cos (20°) sin (100°)

A) $-\frac{1}{2}$ B) $\frac{1}{3}$ C) $\frac{\sqrt{3}}{2}$ D) $-\frac{\sqrt{3}}{2}$

16) sin (265°) cos (25°) − cos (265°) sin (25°)

A) $\frac{\sqrt{3}}{2}$ B) $-\frac{\sqrt{3}}{2}$ C) $-\frac{1}{2}$ D) $\frac{53}{12}$

17) $\frac{\tan(5°)+\tan(25°)}{1-\tan(5°)\tan(25°)}$

A) $\frac{1}{2}$ B) 2 C) $\sqrt{3}$ D) $\frac{\sqrt{3}}{3}$

18) $\frac{\tan(170°)-\tan(50°)}{1+\tan(170°)\tan(50°)}$

A) −2 B) $-\frac{\sqrt{3}}{3}$ C) $-\frac{1}{2}$ D) $-\sqrt{3}$

Write in terms of the cofunction of a complementary angle.

19) tan 46°

A) cot 44° B) tan 44° C) cot 136° D) cot 134°

20) sec 10° 6′

A) csc 80° 6′ B) cos 79° 54′ C) csc 79° 54′ D) cos 169° 54′

Use the identities for the cosine of a sum or a difference to write the expression as a single function of x.

21) cos (x + 270°)

A) cos x B) sin x C) −cos x D) −sin x

Find the exact value, given that cos A = 1/3, with A in quadrant I, and sin B = – 1/2, with B in quadrant IV, and sin C = 1/4, with C in quadrant II.

22) sin (A – B)

A) $\frac{2\sqrt{6} - 1}{6}$ B) $\frac{2\sqrt{6} + 1}{6}$ C) $\frac{\sqrt{3} + 2\sqrt{2}}{6}$ D) $\frac{\sqrt{3} - 2\sqrt{2}}{6}$

Decide whether the equation is or is not an identity. Make sure you work out all the steps that lead to your answer.

23) sin (A + B) + sin (A – B) = 2 sin A cos B

A) Identity B) Not an identity

24) $\tan A + \tan B = \frac{\sin (A + B)}{\cos A \cos B}$

A) Not an identity B) Identity

25) tan (A + π) = tan A

A) Identity B) Not an identity

Decide whether the expression is or is not an identity. Make sure you work out all the steps that lead to your answer.

26) $\frac{1 - \tan x}{1 + \tan x} = \frac{1 - \sin 2x}{\cos 2x}$

A) Not an identity B) Identity

Prove the identity.

27) $\frac{\sin \theta + 1}{\cos \theta} = \frac{\cos \theta}{1 - \sin \theta}$

28) cos (x + y) cos (x – y) = $\cos^2 x \cos^2 y - \sin^2 x \sin^2 y$

29) $\frac{1 - \tan x}{1 + \tan x} = \frac{1 - \sin 2x}{\cos 2x}$

30) $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \csc \theta$

31) $\frac{\tan 4t - \tan 2t}{1 + \tan 4t \tan 2t} = \frac{2 \tan t}{1 - \tan^2 t}$

Use the product–to–sum or sum–to–product identities to find an identity for the given expression.

32) $\sin 7\theta + \sin 19\theta$

A) $\cos 13\theta \sin 6\theta$ B) $-2 \cos 13\theta \cos 6\theta$ C) $2 \cos \frac{13}{2}\theta \sin \frac{13}{2}\theta$ D) $2 \sin 13\theta \cos 6\theta$

33) $\sin 27° \cos 49°$

A) $\frac{1}{2}(\sin 76° - \sin 22°)$ B) $\frac{1}{2}(\sin 22° - \sin 22°)$

C) $\frac{1}{2}(\cos 76° + \sin 22°)$ D) $2(\sin 76° - \sin 22°)$

34) $\cos 28° \cos 47°$

A) $\frac{1}{2}(\sin 19° - \cos 75°)$ B) $\frac{1}{2}(\cos 19° + \sin 75°)$

C) $\frac{1}{2}(\cos 19° + \cos 75°)$ D) $\frac{1}{2}(-\cos -19° - \cos 47°)$

Find the exact value by using a half–angle identity.

35) $\tan 75°$

A) $2 - \sqrt{3}$ B) $2 + \sqrt{3}$ C) $-2 - \sqrt{3}$ D) $-2 + \sqrt{3}$

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

36) $\sqrt{\frac{1 - \cos 58°}{2}}$

A) $\cos 29°$ B) $\sin 29°$ C) $\cot 29°$ D) $\tan 29°$

37) $\frac{\sin 60°}{1 + \cos 60°}$

A) $\cot 30°$ B) $\tan 30°$ C) $\sin 30°$ D) $\cos 30°$

1) D
2) A
3) A
4) A
5) C
6) B
7) C
8) C
9) D
10) B
11) C
12) D
13) B
14) D
15) C
16) B
17) D
18) D
19) A
20) C
21) B
22) B
23) A
24) B
25) A
26) B
27) Answers may vary. One possible solution is:

$$\frac{\sin\theta + 1}{\cos\theta} = \frac{(\sin\theta + 1)(1 - \sin\theta)}{(\cos\theta)(1 - \sin\theta)} = \frac{(1 - \sin^2\theta)}{(\cos\theta)(1 - \sin\theta)} = \frac{\cos^2\theta}{(\cos\theta)(1 - \sin\theta)} = \frac{\cos\theta}{1 - \sin\theta}.$$

28) Answers may vary. One possible solution is:

$\cos(x + y)\ \cos(x - y) = (\cos x \cos y - \sin x \sin y)(\cos x \cos y + \sin x \sin y) = \cos^2 x \cos^2 y - \sin^2 x \sin^2 y.$

29) Answers may vary. One possible solution is:

$$\frac{1 - \tan x}{1 + \tan x} = \frac{(\cos x)(1 - \tan x)}{(\cos x)(1 + \tan x)} = \frac{\cos x - \sin x}{\cos x + \sin x} = \frac{(\cos x - \sin x)(\cos x - \sin x)}{(\cos x + \sin x)(\cos x - \sin x)} = \frac{\cos^2 x - 2\sin x \cos x + \sin^2 x}{\cos^2 x - \sin^2 x} =$$

$$\frac{1 - 2\sin x \cos x}{\cos^2 x - \sin^2 x} = \frac{1 - \sin 2x}{\cos 2x}.$$

30) Answers may vary. One possible solution is:

$$\frac{\sin\theta}{1 + \cos\theta} + \frac{1 + \cos\theta}{\sin\theta} = \frac{\sin^2\theta + (1 + \cos\theta)^2}{(1 + \cos\theta)(\sin\theta)} = \frac{\sin^2\theta + 1 + 2\cos\theta + \cos^2\theta}{(1 + \cos\theta)(\sin\theta)} = \frac{2(1 + \cos\theta)}{(1 + \cos\theta)(\sin\theta)} = 2\csc\theta.$$

31) Answers may vary. One possible solution is:

$$\frac{\tan 4t - \tan 2t}{1 + \tan 4t \tan 2t} = \tan(4t - 2t) = \tan 2t = \frac{2\tan t}{1 - \tan^2 t}$$

32) D
33) A
34) C
35) B
36) B

37) B