Honors Pre-Calculus **Chapter 5 Test Review #1** **Name_____**
March 2015

Evaluate (exact answers).

1. $\sin\left(\frac{\pi}{2}+\arccos\frac{5}{6}\right)$ **1**.)_____

2. $\cos\left(\pi+\arctan\frac{3}{7}\right)$ **2**.)_____

3. $\sin\left(\frac{1}{2}\arccos\frac{5}{13}\right)$ **3**.)_____

Solve the following trig equations for $[0,2\pi)$**.**

4. $\cot x\cos^2 x=2\cot x$ **4**.)_____

5. $\cos^4 x+7\cos^2 x=8$ **5**.)_____

6. $\sin 4x-\sin 2x=0$ **6**.)_____

Name the trigonometric function that is equivalent to the expression.

7. $\dfrac{1}{\sin x}$ **8**. $\dfrac{1}{\tan x}$ **9**. $\sqrt{1+\tan^2 x}$ **7**.)_____

8.)_____

9.)_____

10. $\cos\left(\dfrac{\pi}{2}-x\right)$ **11**. $\tan(-x)$ **10**.)_____

11.)_____

Use the given values to evaluate (if possible) the remaining trigonometric functions of the angle.

12. $\tan\theta=\dfrac{2}{3},\ \sec\theta=\dfrac{\sqrt{13}}{3}$ **13**. $\csc\left(\dfrac{\pi}{2}-\theta\right)=3,\ \sin\theta=\dfrac{2\sqrt{2}}{3}$ **12**.)_____

13.)_____

Simplify.

14. $\dfrac{\sec^2 x-1}{\sec x-1}$ **15**. $\dfrac{\sin^3\beta+\cos^3\beta}{\sin\beta+\cos\beta}$ **14**.)_____

15.)_____

Simplify.

16. $\csc^2 x\left(1-\cos^2 x\right)$

17. $\dfrac{\sin(-x)\cot x}{\sin\left(\dfrac{\pi}{2}-x\right)}$

16.)_____

17.)_____

18. The rate of change of the function $f(x)=\csc x-\cot x$ is given by the expression $\csc^2 x-\csc x\cot x$. Show that this expression can also be written as $\dfrac{1-\cos x}{\sin^2 x}$.

Verify.

19. $\sec^2 x\cot x-\cot x=\tan x$

20. $\cot^2 x-\cos^2 x=\cot^2 x\cos^2 x$

21. $\cos^3 x\sin^2 x=\left(\sin^2 x-\sin^4 x\right)\cos x$

22. $\sqrt{1-\cos x}=\dfrac{|\sin x|}{\sqrt{1+\cos x}}$

23. $\dfrac{1+\sec(-x)}{\sin(-x)+\tan(-x)}=-\csc x$

24. $\tan\left(\dfrac{\pi}{2}-x\right)\sec x=\csc x$

Solve for *x*. Make sure to <u>check</u> all solutions.

25. $4\cos x = 1 + 2\cos x$

26. $\frac{1}{2}\sec x - 1 = 0$

25.)_____

26.)_____

27. $4\tan^2 x - 1 = \tan^2 x$

28. $\sin^2 x + \sin x = 0$

27.)_____

28.)_____

29. $\csc x - 2\cot x = 0$

29.)_____

Solve the following trig equations for $[0, 2\pi)$**.**

30. $2\sin^2 x - 3\sin x = -1$

31. $\sin^2 x + 2\cos x = 2$

30.)_____

31.)_____

32. $\sqrt{3}\tan 3x = 0$

33. $3\csc^2 5x = -4$

32.)_____

33.)_____

Find the exact values of sine, cosine and tangent of the given angle.

34. $345°$ **35**. $\frac{13\pi}{12}$ **34**.)_____

35.)_____

Write the expression as the sine, cosine, or tangent of an angle.

36. $\cos 45°\cos 120° - \sin 45°\sin 120°$ **37**. $\frac{\tan 63° - \tan 118°}{1 + \tan 63°\tan 118°}$ **36**.)_____

37.)_____

Find the exact value of the trigonometric function given that $\sin u = \frac{3}{5}$ **and** $\cos v = -\frac{7}{25}$**. Both *u* and *v* are in Quadrant II.**

38. $\tan(u+v)$ **39**. $\sin(u-v)$ **40**. $\cos(u-v)$ **38**.)_____

39.)_____

40.)_____

Find the value of the expression without using a calculator.

41. $\cos\left(\cos^{-1}1 + \sin^{-1}0\right)$ **42**. $\tan\left[\cos^{-1}(-1) - \cos^{-1}1\right]$ **41**.)_____

42.)_____

Find the exact values of $\sin 2u,\ \cos 2u,$ **and** $\tan 2u$ **using the double angle formulas.**

43. $\cos u = \frac{4}{5},\quad \frac{3\pi}{2} < u < 2\pi$

44. $\tan u = -\frac{2}{9},\quad \frac{\pi}{2} < u < \pi$

43.)_____

44.)_____

Find the exact values of $\sin\frac{u}{2},\ \cos\frac{u}{2},$ **and** $\tan\frac{u}{2}$ **using the half angle formulas.**

45. $112°30'$

46. $\frac{7\pi}{8}$

45.)_____

46.)_____

Find the exact values of $\sin\frac{u}{2}$, $\cos\frac{u}{2}$, **and** $\tan\frac{u}{2}$ **using the half angle formulas.**

47. $\tan u = \frac{21}{20}, \quad \pi < u < \frac{3\pi}{2}$

48. $\sec u = -6, \quad \frac{\pi}{2} < u < \pi$

47.)_____

48.)_____

Use the half angle formulas to simplify the expression.

49. $-\sqrt{\frac{1+\cos 8x}{2}}$

50. $\frac{\sin 10x}{1+\cos 10x}$

49.)_____

50.)_____

Answers

1. $\frac{5}{6}$ **2.** $-\frac{7\sqrt{58}}{58}$ **3.** $\frac{2\sqrt{13}}{13}$ **4.** $\frac{\pi}{2},\frac{3\pi}{2}$ **5.** $0,\pi$ **6.** $0\pi,\pi,\frac{\pi}{2},\frac{3\pi}{2},\frac{\pi}{6},\frac{5\pi}{6},\frac{7\pi}{6},\frac{11\pi}{6}$

7. csc x **8.** cot x **9.** |sec x| **10.** Sin x **11.** -tan x

12.
$\sin\theta=\frac{2\sqrt{13}}{13}$
$\cos\theta=\frac{3\sqrt{13}}{13}$
$\csc\theta=\frac{\sqrt{13}}{2}$
$\cot\theta=\frac{3}{2}$

13.
$\cos\theta=\frac{1}{3}$
$\tan\theta=2\sqrt{2}$
$\csc\theta=\frac{3\sqrt{2}}{4}$
$\sec\theta=3$
$\cot\theta=\frac{\sqrt{2}}{4}$

14. $\sec x+1$ **15.** $1-\sin\beta\cos\beta$

16. 1 **17.** -1 **18-24.** **answers will vary**

25. $\frac{\pi}{3}+2\pi n,\frac{5\pi}{3}+2\pi n$ **26.** $\frac{\pi}{3}+2\pi n,\frac{5\pi}{3}+2\pi n$ **27.** $\frac{\pi}{6}+\pi n,\frac{5\pi}{6}+\pi n$ **28.** $\pi n,\frac{3\pi}{2}+2\pi n$

29. $\frac{\pi}{3}+2\pi n,\frac{5\pi}{3}+2\pi n$ **30.** $\frac{\pi}{6},\frac{\pi}{2},\frac{5\pi}{6}$ **31.** 0π **32.** $0\pi,\pi,\frac{\pi}{3},\frac{2\pi}{3},\frac{4\pi}{3},\frac{5\pi}{3}$

33. no solution

34.
$\sin 345°=\frac{\sqrt{2}-\sqrt{6}}{4}$
$\cos 345°=\frac{\sqrt{6}+\sqrt{2}}{4}$
$\tan 345°=\sqrt{3}-2$

35.
$\sin\frac{13\pi}{12}=\frac{\sqrt{2}-\sqrt{6}}{4}$
$\cos\frac{13\pi}{12}=\frac{-\sqrt{6}-\sqrt{2}}{4}$
$\tan\frac{13\pi}{12}=2-\sqrt{3}$

36. $\cos 165°$ **37.** $\tan(-55°)$ **38.** $\frac{117}{44}$ **39.** $\frac{3}{5}$ **40.** $\frac{4}{5}$

41. 1 **42.** **0**

43.
$\sin 2u=-\frac{24}{25}$
$\cos 2u=\frac{7}{25}$
$\tan 2u=-\frac{24}{7}$

44.
$\sin 2u=-\frac{36}{85}$
$\cos 2u=\frac{77}{85}$
$\tan 2u=-\frac{36}{77}$

45.
$\sin 112°30'=\frac{\sqrt{2+\sqrt{2}}}{2}$
$\cos 112°30'=-\frac{\sqrt{2-\sqrt{2}}}{2}$
$\tan 112°30'=-1-\sqrt{2}$

46.
$\sin\frac{7\pi}{8}=\frac{\sqrt{2-\sqrt{2}}}{2}$
$\cos\frac{7\pi}{8}=-\frac{\sqrt{2+\sqrt{2}}}{2}$
$\tan\frac{7\pi}{8}=1-\sqrt{2}$

47.
$\sin\frac{u}{2}=\frac{7\sqrt{58}}{58}$
$\cos\frac{u}{2}=-\frac{3\sqrt{58}}{58}$
$\tan\frac{u}{2}=-\frac{7}{3}$

48.
$\sin\frac{u}{2}=\frac{\sqrt{21}}{6}$
$\cos\frac{u}{2}=\frac{\sqrt{15}}{6}$
$\tan\frac{u}{2}=\frac{\sqrt{35}}{5}$

49. $-|\cos 4x|$ **50.** $\tan(5x)$