Pre-Calculus – Review Name_____

Verify and Solve Trig Equations Block _____ Date _____

Verify each of the following. Remember to work on one side only!!!

1) $\frac{\tan x \cot x}{\csc x} = \sin x$

2) $\sec^2 x\left(1-\sin^2 x\right) = 1$

3) $\frac{\sec x}{\tan x + \cot x} = \sin x$

4) $\sin^2 x - \cos^2 x = 1 - 2\cos^2 x$

5) $\cos^2 x - \sin^2 x = 1 - 2\sin^2 x$

6) $\cos^2 x - \sin^2 x = 2\cos^2 x - 1$

7) $\sec x - \sec x \sin^2 x = \cos x$

8) $\frac{\csc^2 x}{\cot x} = \csc x \sec x$

9) $\frac{\csc^2 x - 1}{\csc^2 x} = \cos^2 x$

10) $\cos x - \cos x \sin^2 x = \cos^3 x$

11) $\sin x \tan x + \cos x = \sec x$

12) $\frac{\sin x}{1-\cos x} + \frac{1+\cos x}{\sin x} = \frac{2\left(1+\cos x\right)}{\sin x}$

13) $\frac{\sin x + \cos x}{\cos x} - \frac{\sin x - \cos x}{\sin x} = \sec x \csc x$

Solve over the interval $[0,2\pi)$.

14) $3\sin^2 x - \cos^2 x = 0$

15) $\sin^2 x - 2\sin x - 3 = 0$

16) $\cos^2 x - 1 = \sin^2 x$

17) $2\sin^2 x = 1 + \cos x$

18) $2\tan^2 x = \sec x - 1$

19) $4\cos^2 x + 4\sin x - 5 = 0$

20) $2\cos x - 1 = \sec x$

21) $2\cos x + \tan x = \sec x$

22) $2\sin x + \cot x - \csc x = 0$

23) $2\cos^2 x + \sin x - 1 = 0$

24) $1 + \sin x = 2\cos^2 x$

25) $2\sin^2 x - 3\sin x + 1 = 0$

Solve over 1 period.

26) $\cos(2x) = -\frac{1}{2}$

27) $\tan\left(\frac{x}{2}\right) = \sqrt{3}$

28) $\sin(3x) = -1$

29) $\sec\left(\frac{3x}{2}\right) = -2$

30) $\cot\left(\frac{2x}{3}\right) = -\sqrt{3}$

31) $\sin\left(\frac{x}{2}\right) = -\frac{\sqrt{3}}{2}$

Match the trigonometric expression with one of the following (32-37)

(a) -1 (b) $\cos x$ (c) $\cot x$ (d) 1 (e) $\tan x$ (f) $\sin x$

32) $\sec x \cos x$

33) $\cot x \sin x$

34) $\tan^2 x - \sec^2 x$

35) $(1 - \cos^2 x)(\csc x)$

36) $\dfrac{\sec^2 x - 1}{\tan x}$

37) $\csc x \cos x$

38) Determine the period for $y = 2\sin\left(\dfrac{x}{2}\right) - 5$.

39) Determine the amplitude: $y = -5\cos\left(\dfrac{x}{2} + \pi\right)$

40) Determine the period: $y = 3\sin(4x)$

41) Find the value of $\cos\left(\dfrac{5\pi}{3}\right)$.

42) Find the value of $\tan\left(\dfrac{7\pi}{4}\right)$.

43) Find the value of $\sec\left(\dfrac{\pi}{2}\right)$.

Write the following in simplest form using trig identities.

44) $\csc\theta\tan\theta$

45) $\tan\theta\cot\theta - \cos^2\theta$

46) $\sec\theta\cot\theta$

47) $\tan\theta\csc\theta\cos\theta$

48) $\dfrac{\sin^2\theta + \cos^2\theta}{\sin\theta}$

49) $\dfrac{1 - \sin^2\theta}{1 - \cos^2\theta}$

50) $\dfrac{\sin\theta}{\tan\theta}$

51) $\dfrac{\csc\theta}{\sec\theta}$

52) $\dfrac{1 - \sin^2\theta}{\sin^2\theta}$

53) $\dfrac{1+\tan^2\theta}{1+\cot^2\theta}$ 54) $\dfrac{1-\cos^2\theta}{\sin\theta}$ 55) $\dfrac{\cos^2\theta}{1-\sin^2\theta}$

Find all solutions for the following trig equations. Give EXACT answers.

56) $\sin\theta=\dfrac{1}{2}$ 57) $\sin\theta=0$ 58) $\tan\theta=\sqrt{3}$ 59) $\sec\theta=\dfrac{2}{\sqrt{3}}$

60) $\cot\theta=1$ 61) $\sec\theta=\dfrac{-2}{\sqrt{3}}$ 62) $\cos\theta=0$ 63) $\csc\theta=-2$

64) $\tan\theta=\dfrac{1}{\sqrt{3}}$ 65) $\cos\theta=1$ 66) $\sin\theta=-1$ 67) $\cos\theta=\dfrac{\sqrt{2}}{2}$

68) $\sin 2x=\dfrac{\sqrt{2}}{2}$ 69) $\cos\dfrac{x}{2}=\dfrac{\sqrt{3}}{2}$ 70) $\tan 3x=\dfrac{1}{\sqrt{3}}$ 71) $\sin 3x=-\dfrac{1}{2}$

72) $\cos\dfrac{x}{3}=-\dfrac{\sqrt{2}}{2}$ 73) $\sec\dfrac{x}{4}=-2$ 74) $\sin\dfrac{x}{2}=-\dfrac{1}{2}$ 75) $\tan\dfrac{x}{4}=-\sqrt{3}$

Solve over the interval $[0,2\pi)$.

76) $2\sin x-\sqrt{3}=0$ 77) $\tan x\sec x=\tan x$ 78) $\tan^2 x-1=0$

79) $2\sin x-\sqrt{2}=0$ 80) $\sqrt{2}\tan x\cos x-\tan x=0$ 81) $2\cos^2 x=\cos x$

82) $2\cos^2 x-5\cos x+2=0$ 83) $\sin^2 x-\sin x-6=0$ 84) $4\sin^2 x=1$

85) $2\sin^2 x+3\sin x+1=0$ 86) $\sqrt{3}\csc^2 x+2\csc x=0$ 87) $2\sin(2x)-1=0$

88) $4\cos^2 x-4\cos x+1=0$ 89) $2\sec^2 x-3\sec x-2=0$ 90) $\sin x\tan^2 x=\sin x$

91) $\tan^2 x=\dfrac{1}{3}$ 92) $4\sec x+6=-2$ 93) $5\csc x-3=2$

1.) $\dfrac{\dfrac{\tan x}{1}\bullet\dfrac{1}{\tan x}}{\csc x}=\dfrac{1}{\csc x}=\sin x$	2.) $\sec^2 x\left(\cos^2 x\right)=$ $\dfrac{1}{\cos^2 x}\bullet\dfrac{\cos^2 x}{1}=1$	3.) $\dfrac{\dfrac{1}{\cos x}}{\dfrac{\sin x}{\cos x}+\dfrac{\cos x}{\sin x}}=$ $\dfrac{\dfrac{1}{\cos x}}{\dfrac{\sin^2 x+\cos^2 x}{\cos x\sin x}}=$ $\dfrac{1}{\cos x}\div\dfrac{1}{\cos x\sin x}=$ $\dfrac{1}{\cos x}\bullet\dfrac{\cos x\sin x}{1}=\sin x$
4.) $\left(1-\cos^2 x\right)-\cos^2 x=$ $1-2\cos^2 x$	5.) $\left(1-\sin^2 x\right)-\sin\ x=$ $1-2\sin^2 x$	6.) $\cos^2 x-\left(1-\cos^2 x\right)=$ $\cos^2 x-1+\cos^2 x=$ $2\cos^2 x-1$
7.) $\sec x\left(1-\sin^2 x\right)=$ $\sec x\bullet\cos^2 x=$ $\dfrac{1}{\cos x}\bullet\dfrac{\cos^2 x}{1}=\cos x$	8.) $\dfrac{1}{\sin^2 x}\div\dfrac{\cos x}{\sin x}=$ $\dfrac{1}{\sin^2 x}\bullet\dfrac{\sin x}{\cos x}=$ $\dfrac{1}{\sin x}\bullet\dfrac{1}{\cos x}=$ $\csc x\sec x$	9.) $\dfrac{\cot^2 x}{\csc^2 x}=\dfrac{\cos^2 x}{\sin^2 x}\div\dfrac{1}{\sin^2 x}=$ $\dfrac{\cos^2 x}{\sin^2 x}\bullet\dfrac{\sin^2 x}{1}=\cos^2 x$
10.) $\cos x\left(1-\sin^2 x\right)=$ $\cos x(\cos^2 x)=\cos^3 x$	11.) $\dfrac{\sin x}{1}\bullet\dfrac{\sin x}{\cos x}+\dfrac{\cos x}{1}=$ $\dfrac{\sin^2 x}{\cos x}+\dfrac{\cos^2 x}{\cos x}=$ $\dfrac{\sin^2 x+\cos^2 x}{\cos x}=$ $\dfrac{1}{\cos x}=\sec x$	12.) $\dfrac{\sin^2 x+(1+\cos x)(1-\cos x)}{\sin x(1-\cos x)}$ $\dfrac{\sin^2 x+1-\cos^2 x}{\sin x(1-\cos x)}=$ $\dfrac{1-\cos^2 x+1-\cos^2 x}{\sin x(1-\cos x)}=$ $\dfrac{2(1-\cos^2 x)}{\sin x(1-\cos x)}=$ $\dfrac{2(1-\cos x)(1+\cos x)}{\sin x(1-\cos x)}=$ $\dfrac{2(1+\cos x)}{\sin x}$

13.) $\frac{\sin x(\sin x+\cos x)-\cos x(\sin x-\cos x)}{\sin x\cos x}=$ $\frac{\sin^2 x+\sin x\cos x-\sin x\cos x+\cos\ x}{\sin x\cos x}=$ $\frac{\sin^2 x+\cos^2 x}{\sin x\cos x}=\frac{1}{\sin x\cos x}=$ $\frac{1}{\sin x}\bullet\frac{1}{\cos x}=\csc x\sec x$	14.) $\frac{\pi}{6},\frac{5\pi}{6},\frac{7\pi}{6},\frac{11\pi}{6}$	15.) $\frac{3\pi}{2}$
16.) $0,\pi$	17.) $\frac{\pi}{3},\frac{5\pi}{3},\pi$	18.) 0
19.) $\frac{\pi}{6},\frac{5\pi}{6}$	20.) $\frac{2\pi}{3},\frac{4\pi}{3},0$	21.) $\frac{7\pi}{6},\frac{11\pi}{6},\frac{\pi}{2}$
22.) $\frac{2\pi}{3},\frac{4\pi}{3},0$	23.) $\frac{7\pi}{6},\frac{11\pi}{6},\frac{\pi}{2}$	24.) $\frac{\pi}{6},\frac{5\pi}{6},\frac{3\pi}{2}$
25.) $\frac{\pi}{6},\frac{5\pi}{6},\frac{\pi}{2}$	26.) $\frac{\pi}{3},\frac{2\pi}{3}$	27.) $\frac{2\pi}{3},\frac{8\pi}{3}$
28.) $\frac{\pi}{2}$	29.) $\frac{4\pi}{9},\frac{8\pi}{9}$	30.) $\frac{5\pi}{4},\frac{11\pi}{4}$
31.) $\frac{8\pi}{3},\frac{10\pi}{3}$	32.) D	33.) B
34.) A	35.) F	36.) E
37.) C	38.) 4π	39.) 5
40.) $\frac{\pi}{2}$	41.) $\frac{1}{2}$	42.) -1
43.) undefined	44.) $\sec\theta$	45.) $\sin^2\theta$
46.) $\csc\theta$	47.) 1	48.) $\sec\theta$
49.) $\cot^2\theta$	50.) $\cos\theta$	51.) $\cot\theta$
52.) $\cot^2\theta$	53.) $\tan^2\theta$	54.) $\sin\theta$
55.) 1	56.) $\frac{\pi}{6}+2\pi k,\frac{5\pi}{6}+2\pi k$	57.) $0+2\pi k,\pi+2\pi k$
58.) $\frac{\pi}{3}+\pi k,\frac{4\pi}{3}+\pi k$	59.) $\frac{\pi}{6}+2\pi k,\frac{11\pi}{6}+2\pi k$	60.) $\frac{\pi}{4}+\pi k,\frac{5\pi}{4}+\pi k$
61.) $\frac{5\pi}{6}+2\pi,\frac{7\pi}{6}+2\pi k$	62.) $\frac{\pi}{2}+2\pi k,\frac{3\pi}{2}+2\pi k$	63.) $\frac{7\pi}{6}+2\pi k,\frac{11\pi}{6}+2\pi k$

64.) $\frac{\pi}{6}+\pi k, \frac{7\pi}{6}+\pi k$	65.) 0	66.) $\frac{3\pi}{2}$
67.) $\frac{\pi}{4}, \frac{7\pi}{4}$	68.) $\frac{\pi}{8}+\pi k, \frac{3\pi}{8}+\pi k$	69.) $\frac{\pi}{3}+4\pi k, \frac{11\pi}{3}+4\pi k$
70.) $\frac{\pi}{18}+\frac{\pi}{3}k, \frac{7\pi}{18}+\frac{\pi}{3}k$	71.) $\frac{7\pi}{18}+\frac{2\pi}{3}k, \frac{11\pi}{18}+\frac{2\pi}{3}k$	72.) $\frac{9\pi}{4}+6\pi k, \frac{15\pi}{4}+6\pi k$
73.) $\frac{8\pi}{3}+8\pi k, \frac{16\pi}{3}+8\pi k$	74.) $\frac{14\pi}{6}+4\pi k, \frac{22\pi}{6}+4\pi k$	75.) $\frac{8\pi}{3}+4\pi k, \frac{20\pi}{3}+4\pi k$
76.) $\frac{\pi}{3}, \frac{2\pi}{3}$	77.) $0, \pi$	78.) $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$
79.) $\frac{\pi}{4}, \frac{3\pi}{4}$	80.) $0, \pi, \frac{\pi}{4}, \frac{7\pi}{4}$	81.) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{3}, \frac{5\pi}{3}$
82.) $\frac{\pi}{3}, \frac{5\pi}{3}$	83.) none	84.) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$
85.) $\frac{7\pi}{6}, \frac{11\pi}{6}, \frac{3\pi}{2}$	86.) $\frac{4\pi}{3}, \frac{5\pi}{3}$	87.) $\frac{\pi}{12}, \frac{5\pi}{12}$
88.) $\frac{\pi}{3}, \frac{5\pi}{3}$	89.) $\frac{\pi}{3}, \frac{5\pi}{3}$	90.) $0, \pi, \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$
91.) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$	92.) $\frac{2\pi}{3}, \frac{4\pi}{3}$	93.) $\frac{\pi}{2}$