No.
Date:

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Problem set 1.3

12 verify that the following are identities

a. $(1+\sin z)(1-\sin z) = \dfrac{1}{\sec^2 z}$

$(1+\sin z)(1-\sin z) = \cos^2 z$

$\cos^2 z = \dfrac{1}{\sec^2 z}$

b. $(\sec t-1)(\sec t+1) = \tan^2 t$

$(\sec t-1)(\sec t+1) = \sec^2 t - 1 = \tan^2 t$

c. $\sec t - \sin t \cdot \tan t = \cos t$

$= \dfrac{1}{\cos t} - \dfrac{\sin^2 t}{\cos t}$

$= \dfrac{1-\sin^2 t}{\cos t} = \dfrac{\cos^2 t}{\cos t} = \cos t$

d. $\dfrac{\sec^2 t - 1}{\sec^2 t} = \sin^2 t$

$= \dfrac{\sec^2 t - 1}{\sec^2 t} = \dfrac{\tan^2 t}{\sec^2 t} = \dfrac{\frac{\sin^2 t}{\cos^2 t}}{\frac{1}{\cos^2 t}} = \sin^2 t$

13 Verify the following are identities

a. $\dfrac{\sin u}{\csc u} + \dfrac{\cos u}{\sec u} = 1$

$= \sin^2 u + \cos^2 u = 1$

b. $(1-\cos^2 x)(1+\cot^2 x) = 1$

$= (\sin^2 x)(\csc^2 x)$

$= \sin^2 x \left(\dfrac{1}{\sin^2 x}\right) = 1$

c. $\sin t(\csc t - \sin t) = \cos^2 t$

$= \sin t\left(\dfrac{1}{\sin t} - \sin t\right)$

$= 1 - \sin^2 t = \cos^2 t$

d. $\dfrac{1-\csc^2 t}{\csc^2 t} = \dfrac{-1}{\sec^2 t}$

$= -\dfrac{\cot^2 t}{\csc^2 t} = -\cos^2 t = -\dfrac{1}{\sec^2 t}$

Problem Set 1.9

25 $\cos\left[2\sin^{-1}\left(-\frac{2}{3}\right)\right] =$ $\sin\theta = -\frac{2}{3}$

$\cos[2\theta] = 1 - 2\sin^2\theta$

$\cos\left[2\sin^{-1}(-2/3)\right] = 1 - 2\left(-\frac{2}{3}\right)^2$

$= 1 - 2\left(\frac{4}{9}\right)$

$= 1 - \frac{8}{9}$

$= \frac{1}{9}$

26 $\tan\left[2\tan^{-1}\left(\frac{1}{3}\right)\right]$ $\tan\theta = 1/3$

$\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta} = \frac{2\cdot 1/3}{1-(1/3)^2} = \frac{2/3}{1-1/9} = \frac{2/3}{8/9}$

$= \frac{18}{24} = \frac{3}{4}$

27 $\sin\left[\cos^{-1}\left(\frac{3}{5}\right) + \cos^{-1}\left(\frac{5}{13}\right)\right]$

$\sin[a+B] = \sin a \cdot \cos B + \cos a \sin B$

$\cos a = \sqrt{1-\sin^2(a)} = \sqrt{1-\frac{9}{25}} = \sqrt{16/25} = 4/5$

$\cos B = \sqrt{1-\sin^2(B)} = \sqrt{1-\frac{25}{169}} = \sqrt{144/169} = 12/13$

$\sin[a+B] = (3/5)\cdot(12/13) + (4/5)\cdot(5/13) = (36/65) + (20/65)$

$= 56/65$

28 $\cos\left[\cos^{-1}(4/5) + \sin^{-1}\left(\frac{12}{13}\right)\right]$

$\sin a = \sqrt{1-\cos^2 a} = \sqrt{1-\frac{16}{25}} = \sqrt{9/25} = 3/5$

$\cos B = \sqrt{1-\sin^2 B} = \sqrt{1-\frac{144}{169}} = \sqrt{25/169} = 5/13$

$\cos[a+B] = \cos a \cdot \cos B - \sin a \sin B$

$= (4/5)(5/13) - (3/5)\cdot(12/13)$

$= 20/65 - 36/65 = \frac{-16}{65} = -16/65$

29 $\tan(\sin^{-1} x) = \frac{x}{\sqrt{1-x^2}}$

$= \frac{\sin}{\cos} \cdot (\sin^{-1} x) = \frac{x}{\sqrt{1-x^2}}$

30 $\sin(\tan^{-1} x) = \frac{x}{\sqrt{1+x^2}}$

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

31 $\cos(2 \sin^{-1} x) = 1 - 2x^2$

$\cos 2x =$

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

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

~~31~~

32 $\tan(2 \tan^{-1} x) = \frac{2x}{1-x^2}$

~~32~~ $\tan 2x = \frac{2 \tan x}{1 - \tan^2 x} = \frac{2 \tan(\tan^{-1} x)}{1 - \tan^2(\tan^{-1} x)} = \frac{2x}{1-x^2}$