Tuesday - October 28, 2014

(39) $\sec x \cdot \frac{\sin x}{\tan x}$

$\frac{1}{\cos x} \cdot \frac{\sin x}{1} \cdot \frac{1}{\tan x} \frac{\cos x}{\sin x}$

$\boxed{1}$

(39) $\sec x \cdot \frac{\sin x}{\tan x}$

$\frac{h}{a} \cdot \frac{o}{h} \cdot \frac{a}{o}$

$\boxed{1}$

(24) $(1-\cos^2 x)\csc x \rightarrow \left(1-\frac{a^2}{h^2}\right)\frac{h}{o}$

$\sin^2 x \csc x$ $\quad \frac{h}{o} - \frac{a^2 h}{h^2 o}$

$\sin^2 x \cdot \frac{1}{\sin x}$

~~$\sin^2 x + \cos^2 x = 1$~~ $\quad a^2 + o^2 = h^2$

$\boxed{\sin x}$ $\quad \frac{o}{h}$

(41) $\sin\left(\frac{\pi}{2} - x\right)\csc x$

$\cos x \frac{1}{\sin x}$

$\cot x$

(47) $\frac{\cos^2 x - 4}{\cos x - 2}$ $\quad \frac{x^2-4}{x-2} = \frac{(x+2)(x-2)}{x-2}$

$x+2$

$\frac{(\cos x+2)(\cos x-2)}{(\cos x-2)}$

$\boxed{\cos x + 2}$

(49) $\tan^4 x + 2\tan^2 x + 1$

$x = \tan x$

$x^4 + 2x^2 + 1$

$(x^2+1)(x^2+1)$

$(\tan^2 x+1)(\tan^2 x+1)$

$\sec^2 x \quad \sec^2 x$

$\boxed{\sec^4 x}$

(51) $\sin^4 x - \cos^4 x$

$(\sin^2 x + \cos^2 x)(\sin^2 x - \cos^2 x)$

$1\,(\sin x + \cos x)(\sin x - \cos x)$

$\boxed{\sin^2 x - \cos^2 x}$

$x^4 - y^4$

$(x^2 + y^2)(x^2 - y^2)$

$(x^2 + y^2)(x + y)(x - y)$

(79) $\sqrt{25 - x^2}$, $x = 5\sin\theta$

$\sqrt{25 - (5\sin\theta)^2}$

$\sqrt{25 - 25\sin^2\theta}$

$\sqrt{25(1 - \sin^2\theta)} = \sqrt{25\cos^2\theta} = \boxed{5\cos\theta}$

$x - x\sin^2\theta$

$x(1 - \sin^2\theta)$

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

$-\sin^2 x \quad -\sin^2 x$

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

(80) $\sqrt{64 - 16x^2}$, $x = 2\cos\theta$

$\sqrt{64 - 16(2\cos\theta)^2}$

$\sqrt{64 - 64\cos^2\theta}$

$\sqrt{64(1 - \cos^2\theta)}$

$\sqrt{64\sin^2\theta}$ → $\boxed{8\sin\theta}$

U7 D2 - Verifying Identities

Tips: P. 357

★ Your work is the answer.

Verify

$$\frac{\sec^2\theta - 1}{\sec^2\theta} = \sin^2\theta$$

$$\frac{\tan^2\theta}{\sec^2\theta} = \sin^2\theta$$

$1 + \tan^2 x = \sec^2 x$

$$\frac{\sin^2\theta}{\cancel{\cos^2\theta}} \cancel{\cos^2\theta} = \sin^2\theta \quad \checkmark$$

Verify

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

$$2\sec^2 x = \frac{1+\sin x}{1-\sin^2 x} + \frac{1-\sin x}{1-\sin^2 x}$$

$$2\sec^2 x = \frac{2}{\cos^2 x}$$

$$2\sec^2 x = 2\sec^2 x \checkmark$$

Verify

$$\frac{\sec(-x)}{\csc(-x)} = -\tan x$$

$$\frac{\sec(x)}{\frac{+\csc(x)}{-1}} = \frac{+\tan x}{-1}$$

$$\frac{1}{\cos x}\cdot\sin x = \tan x$$

$\tan x = \tan x$ ✓

Even

$f(x) = f(-x)$

e.g. $f(x) = x^2$

$f(2) = 4$

$f(-2) = 4$

Odd

$f(-x) = -f(x)$

$f(x) = f(x)$

e.g. $f(x) = x^3$

$f(2) = 8$

$f(-2) = -8$

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

$$+2\sin^2 x \quad +2\sin^2 x$$

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

$$1 = 1 \checkmark$$

13) $\dfrac{\csc^2 x}{\cot x} = \csc x \sec x$

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

✓