Name : _____

Verify: Product-Sum & Sum-Product Identities

Verify the following.

1) $\frac{\sin x - \sin 3x}{\cos x + \cos 3x} = -\tan x$

2) $\frac{\cos 12x \cos}{\cos 14x + \cos}$

3) $4 \sin x \cos 8x$

Name : _____

Verify: Product-Sum & Sum-Product Identities

Verify the following.

4) $12 \cos 13x \sin 7x = 6 (\sin 20x - \sin 6x)$

5) $\frac{\cos 6x + \cos 4}{\sin 6x + \sin 4}$

6) $2 + \frac{\sin 5x - si}{\cos 3x \sin}$

Name : _____

Answer key

Sheet 1

Verify: Product-Sum & Sum-Product Identities

Verify the following.

1) $\dfrac{\sin x - \sin 3x}{\cos x + \cos 3x} = -\tan x$

$\dfrac{\sin x - \sin 3x}{\cos x + \cos 3x} = \dfrac{2\cos\left(\dfrac{x+3x}{2}\right)\sin\left(\dfrac{x-3x}{2}\right)}{2\cos\left(\dfrac{x+3x}{2}\right)\cos\left(\dfrac{x-3x}{2}\right)}$ Using sum to product identities

$= \dfrac{\cancel{2\cos 2x}\sin(-x)}{\cancel{2\cos 2x}\cos(-x)}$ Cancel the common factors

uotient identity

ven/odd identity

2) $\dfrac{\cos 12x \cos}{\cos 14x + \cos}$

$\dfrac{\cos 12x \cos 2x}{\cos 14x + \cos 1(}$ roduct to sum identity

he common factors

3) $4 \sin x \cos 8x$

$4 \sin x \cos 8x = 4\left(\frac{1}{2}(\sin(x+8x) + \sin(x-8x))\right)$ Using product to sum identity

$= 4\left(\frac{1}{2}(\sin 9x + \sin 7x)\right)$

$= 2(\sin 9x + \sin 7x)$ Simplify

Name : _____

Answer key

Verify: Product-Sum & Sum-Product Identities

Verify the following.

4) $12 \cos 13x \sin 7x = 6 (\sin 20x - \sin 6x)$

$12 \cos 13x \sin 7x = 12\left(\frac{1}{2}(\sin (13x + 7x) - \sin (13x - 7x))\right)$ Using product to sum identity

$= 12\left(\frac{1}{2}(\sin 20x - \sin 6x)\right)$

5) $\frac{\cos 6x + \cos 4}{\sin 6x + \sin 4}$

$\frac{\cos 6x + \cos 4}{\sin 6x + \sin 4}$ sum to product ities

l the common factors

quotient identity

6) $2 + \frac{\sin 5x - \sin}{\cos 3x \sin}$

$2 + \frac{\sin 5x - \sin x}{\cos 3x \sin 2x} = 2 + \frac{2 \cos\left(\frac{5x + x}{2}\right) \sin\left(\frac{5x - x}{2}\right)}{\cos 3x \sin 2x}$ Using sum to product identity

$= 2 + \frac{2 \cancel{\cos 3x \sin 2x}}{\cancel{\cos 3x \sin 2x}}$ Cancel the common factors

$= 4$