Name : _____

Verify: Product-Sum & Sum-Product Identities

Verify the following.

1) $\frac{\cos 8x - \cos 2x}{2 \sin 5x \sin 3x} = -1$

2) 2 sin 4x cos 9

3) $\frac{\sin 15x - \sin 7}{\sin 11x}$

Name : _____

Verify: Product-Sum & Sum-Product Identities

Verify the following.

4) $\dfrac{\sin 9x \sin 3x}{\cos 9x \cos 3x} = \dfrac{\cos 6x - \cos 12x}{\cos 12x + \cos 6x}$

5) $\dfrac{\sin 8x + \sin 1(}{\sin 8x - \sin 1(}$

6) $\cos 17x \sin 5x$

Name : _____

Answer key

Sheet 2

Verify: Product-Sum & Sum-Product Identities

Verify the following.

1) $\dfrac{\cos 8x - \cos 2x}{2 \sin 5x \sin 3x} = -1$

$\dfrac{\cos 8x - \cos 2x}{2 \sin 5x \sin 3x} = \dfrac{-2 \sin\left(\dfrac{8x + 2x}{2}\right) \sin\left(\dfrac{8x - 2x}{2}\right)}{2 \sin 5x \sin 3x}$ Using sum to product identity

$= \dfrac{-2 \sin 5x \sin 3x}{\quad}$ Cancel the common factors

2) 2 sin 4x cos 9

2 sin 4x cos product to sum identity

l the common factors

even/odd identity

3) $\dfrac{\sin 15x - \sin 7}{\sin 11x}$

$\dfrac{\sin 15x - \sin 7x}{\sin 11x} = \dfrac{2 \cos\left(\dfrac{15x + 7x}{2}\right) \sin\left(\dfrac{15x - 7x}{2}\right)}{\sin 11x}$ Using sum to product identity

$= \dfrac{2 \cos 11x \sin 4x}{\sin 11x}$

$= 2 \cot 11x \sin 4x$ Using quotient identity

Name : _____

Answer key

Verify: Product-Sum & Sum-Product Identities

Verify the following.

4) $\dfrac{\sin 9x \sin 3x}{\cos 9x \cos 3x} = \dfrac{\cos 6x - \cos 12x}{\cos 12x + \cos 6x}$

$\dfrac{\sin 9x \sin 3x}{\cos 9x \cos 3x} = \dfrac{\frac{1}{2}(\cos (9x - 3x) - \cos (9x + 3x))}{\frac{1}{2}(\cos (9x + 3x) + \cos (9x - 3x))}$ Using product to sum identity

$= \dfrac{\frac{1}{2}(\cos 6x - \cos 12x)}{1}$

...e common factors

5) $\dfrac{\sin 8x + \sin 1(}{\sin 8x - \sin 1(}$

$\dfrac{\sin 8x + \sin 1(}{\sin 8x - \sin 1(}$ ...m to product identity

...e common factors

...otient identity

...en/odd identity

6) $\cos 17x \sin 5x$

$\cos 17x \sin 5x = \frac{1}{2}((\sin (17x + 5x) - \sin (17x - 5x))$ Using product to sum identity

$= \frac{1}{2}(\sin 22x - \sin 12x)$

$= \dfrac{\sin 22x - \sin 12x}{2}$