

Verify: Product-Sum & Sum-Product Identities

Verify the following.

1) $6(\sin 14x - \sin 6x) = 12 \cos 10x \sin 4x$

2) $\frac{\sin 20x \cos 14x}{\cos 20x \sin 14x}$

3) $\frac{\cos 10x + \cos 20x}{\cos 10x - \cos 20x}$

PREVIEW

Gain complete access to the largest
collection of worksheets in all subjects!

Members, please
log in to
download this
worksheet.

Not a member?
Please sign up to
gain complete
access.

www.mathworksheets4kids.com

Name : _____

Verify: Product-Sum & Sum-Product Identities

Verify the following.

4) $\frac{2 \cos 3x \cos 2x}{\cos 5x} = 1 + \frac{\cos x}{\cos 5x}$

5) $2 \sin 15x \sin 7x$

6) $\frac{\sin 6x + \sin 10x}{\sin 11x}$

PREVIEW

Gain complete access to the largest
collection of worksheets in all subjects!

Members, please
log in to
download this
worksheet.

Not a member?
Please sign up to
gain complete
access.

www.mathworksheets4kids.com

Verify: Product-Sum & Sum-Product Identities

Verify the following.

1) $6(\sin 14x - \sin 6x) = 12 \cos 10x \sin 4x$

$$6(\sin 14x - \sin 6x) = 6 \left(2 \cos \left(\frac{14x + 6x}{2} \right) \sin \left(\frac{14x - 6x}{2} \right) \right) \text{ Using product to sum identity}$$

$$= 6(2 \cos 10x \sin 4x)$$

2) $\frac{\sin 20x \cos 14x}{\cos 20x \sin 14x}$

$$\frac{\sin 20x \cos 14x}{\cos 20x \sin 14x}$$

PREVIEW

Gain complete access to the largest collection of worksheets in all subjects!

Members, please log in to download this worksheet.

Not a member? Please sign up to gain complete access.

www.mathworksheets4kids.com

product to sum identity

the common factors

3) $\frac{\cos 10x + \cos 12x}{\cos 10x - \cos 12x}$

$$\frac{\cos 10x + \cos 12x}{\cos 10x - \cos 12x} = \frac{2 \cos \left(\frac{10x + 12x}{2} \right) \cos \left(\frac{10x - 12x}{2} \right)}{-2 \sin \left(\frac{10x + 12x}{2} \right) \sin \left(\frac{10x - 12x}{2} \right)} \text{ Using sum to product identity}$$

$$= \frac{2 \cos 11x \cos (-x)}{-2 \sin 11x \sin (-x)}$$

Cancel the common factors

$$= -\cot 11x \cot (-x)$$

Using quotient identity

$$= \cot 11x \cot x$$

Using even/odd identity

Verify: Product-Sum & Sum-Product Identities

Verify the following.

$$4) \quad \frac{2 \cos 3x \cos 2x}{\cos 5x} = 1 + \frac{\cos x}{\cos 5x}$$

$$\frac{2 \cos 3x \cos 2x}{\cos 5x} = \frac{2 \left(\frac{1}{2} (\cos (3x + 2x) + \cos (3x - 2x)) \right)}{\cos 5x} \quad \text{Using product to sum identity}$$

$$= \frac{2 \left(\frac{1}{2} (\cos 5x + \cos x) \right)}{\cos 5x} \quad \text{Cancel the common factors}$$

PREVIEW

the common factors

$$5) \quad 2 \sin 15x \sin 7x$$

$$2 \sin 15x \sin 7x = 2 \sin 15x \sin 7x \quad \text{product to sum identity}$$

Members, please
log in to
download this
worksheet.

Not a member?
Please sign up to
gain complete
access.

the common factors

$$6) \quad \frac{\sin 6x + \sin 16x}{\sin 11x}$$

$$\frac{\sin 6x + \sin 16x}{\sin 11x} = \frac{2 \sin \left(\frac{6x + 16x}{2} \right) \cos \left(\frac{6x - 16x}{2} \right)}{\sin 11x} \quad \text{Using sum to product identity}$$

$$= \frac{2 \sin 11x \cos (-5x)}{\sin 11x} \quad \text{Cancel the common factors}$$

$$= 2 \cos 5x \quad \text{Using even/odd identity}$$