Name : _____

Verify - Double & Half-Angle Identities

Verify the following.

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

2) $\sin 3x = 3 \sin$

3) $\tan \frac{x}{2} \csc x =$

Name : _____

Verify - Double & Half-Angle Identities

Verify the following.

4) $2 \sin^2 x + \cos 2x = 1$

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

6) $\frac{2 \tan x}{\cot^2 x - 1} = t$

Name : _____

Answer key

Sheet 1

Verify - Double & Half-Angle Identities

Verify the following.

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

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

$= \sin^2 x \dfrac{1}{\sin x}$ Using double-angle identity

$=$

2) $\sin 3x = 3 \sin$

$\sin 3x =$

$=$ g sum identity

$=$ g double-angle tities

$=$ tiply

$=$ g Pythagorean identity

$=$ tiply

$=$ olify

3) $\tan \dfrac{x}{2} \csc x =$

$\tan \dfrac{x}{2} \csc x = \dfrac{}{\sin x}$ Using reciprocal identity

$= \left(\dfrac{\sin x}{1 + \cos x}\right)\left(\dfrac{1}{\sin x}\right)$ Using half-angle identity

$= \left(\dfrac{\cancel{\sin x}}{1 + \cos x}\right)\left(\dfrac{1}{\cancel{\sin x}}\right)$ Cancel the common factors

$= \dfrac{1}{1 + \cos x}$

Name : _____

Answer key

Verify - Double & Half-Angle Identities

Verify the following.

4) $2\sin^2 x + \cos 2x = 1$

$2\sin^2 x + \cos 2x = 2\sin^2 x + 1 - 2\sin^2 x$ — Using double-angle identity

$= 2\sin^2 x + 1 - 2\sin^2 x$ — Simplify

$= 1$

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

$\dfrac{\sin 2}{1 - \cos}$ — uble-angle identities

e common factors

otient identity

6) $\dfrac{2\tan x}{\cot^2 x - 1} = t$

$\dfrac{2\tan}{\cot^2 x - 1} = \dfrac{}{\dfrac{1}{\tan^2 x} - 1}$ — Using reciprocal identity

$= \left(\dfrac{2\tan x}{1 - \tan^2 x}\right)\tan^2 x$ — Combine quotients

$= \tan 2x \tan^2 x$ — Using double-angle identity