Name: ____

Half Angle and Power Reducing Formulas

1) Simplify each expression

1) $\pm\sqrt{\dfrac{1+\cos 12x}{2}}$

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

2) Solve the equation $3\cos 2x = \cos x - 2$ in the range $0^0 \le x \le 360^0$

3) Find precise values for each of the following, showing each step of your argument:

1) $\cos\left(-\dfrac{\pi}{8}\right)$

2) $\sin\left(-\dfrac{\pi}{8}\right)$

3) $\cos\left(\dfrac{7\pi}{12}\right)$

4) $\tan\left(\dfrac{7\pi}{12}\right)$

4) Verify that each equation is an identity

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

2) $\sec 2x = \dfrac{\sec^2 x + \sec^4 x}{2 + \sec^2 x - \sec^4 x}$

3) $\sin 4x = 4\sin x \cos x \cos 2x$

4) $\dfrac{1+\cos 2x}{\sin 2x} = \cot x$

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

6) $\sin 4x = 4\sin x \cos x - 8\sin^3 x \cos x$

7) $\tan x + \cot x = 2\csc x$

8) $\sin 2x \cos 2x = \sin 2x - 4\sin^3 x \cos x$

9) $\sec^2 \dfrac{x}{2} = \dfrac{2}{1+\cos x}$

10) $\cot^2 \dfrac{x}{2} = \dfrac{(1+\cos x)^2}{\sin^2 x}$

11) $\sin^2 \dfrac{x}{2} = \dfrac{\tan x - \sin x}{2\tan x}$

12) $\dfrac{\cot x - \tan x}{\cot x + \tan x} = \cos 2x$

13) $\cos 2x = \dfrac{1-\tan^2 x}{1+\tan^2 x}$

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