Name: _____ Per: _____ Date: _____

Serafino ▪ Precalculus

5.3 Double Angle Formulas & Equations Worksheet (& 6.2/6.3)

Using Double Angle Formulas in Proofs & Simplification/Evaluation
From Problem Set 5.3 (the problems are the same, the numbers are different)

1. Let $\sin A = -\frac{3}{5}$ in QIII. Find: a) sin 2A b) tan 2A

2. Let $\cos x = \frac{\sqrt{10}}{10}$ in QIV Find: a) cos 2x b) cot 2x

3. Let $\tan\theta = \frac{5}{12}$ in QI Find: a) sin 2θ b) csc 2θ

4. corrected Let $\csc t = \sqrt{5}$ in QIV Find: a) cos 2t b) sec 2t

5. Condense the following as a single (graphable) trig function:

   a) $y = 4 - 8\sin^2 x$ b) $y = 6\cos^2 x - 3$ c) $y = 1 - 2\sin^2(2x)$

6. Use exact values to prove that the following are true:

   a) $\sin 60° = 2\sin 30°\cos 30°$ b) $\cos 120° = \cos^2 60° - \sin^2 60°$

7. If $\tan A = \frac{3}{4}$ find: tan 2A

8. Simplify and evaluate the following:

   a) $2\sin 15°\cos 15°$ b) $1 - 2\sin^2 75°$ c) $\sin\frac{\pi}{12}\cos\frac{\pi}{12}$ d) $\frac{\tan 22.5°}{1-\tan^2 22.5°}$

9. Prove the following identities:

   a) $(\sin x - \cos x)^2 = 1 - \sin 2x$ →
   b) $\cos^2\theta = \frac{1+\cos 2\theta}{2}$ ←
   c) $\cot x = \frac{\sin 2x}{1-\cos 2x}$ ←
   d) $2\csc 2x = \tan x + \cot x$ ←
   e) $\sin 3x = 3\sin x - 4\sin^3 x$ →
   f) $\cos^4 x - \sin^4 x = \cos 2x$ →
   g) $\cot x - \tan x = \frac{\cos 2x}{\sin x\cos x}$ ←
   h) $\sin 4A = 4\sin A\cos^3 A - 4\sin^3 A\cos A$ →
   i) $\frac{1-\tan x}{1+\tan x} = \frac{1-\sin 2x}{\cos 2x}$ →

Using Double Angle Formulas to Solve Equations
From Problem Sets 6.2 & 6.3 (the problems are the same, the numbers are different)

10. Give a list of all solutions between 0° and 360°

    a) $\sin 2\theta - \cos\theta = 0$
    b) $\cos 2x - 3\sin x - 2 = 0$
    c) $\cos x - \cos 2x = 0$
    d) $\sin x + \cos x = \sqrt{2}$
    e) $7\sin^2 x - 9\cos 2x = 0$ (calculator required)
    f) $\cos x - \sin x = 1$
    g) $\sin x + \cos x = -1$