Name:_____ Date:_____

Math 9 Honors: Assignment 6.7 Sum and Difference Angle Properties

1. Write each of the following angles as a sum or difference of $30°, 45°, 60°, 90°, 180°, 270°, and\ 360°$ with as many different combinations as possible

a) $135°$	b) $225°$	c) $120°$	d) $240°$	e) $150°$
f) $210°$	g) $300°$	h) $330°$	i) $315°$	j) $240°$

2. Find the exact of the following using the double angle properties. (Do no use a calculator)

a) $\sin(120°)$	b) $\cos(225°)$
c) $\sin(300°)$	d) $\sin(210°)$
e) $\cos(210°)$	f) $\cos(150°)$
g) $\cos(315°)$	h) $\sin(240°)$
i) $\cos(120°)$	j) $\cos(300°)$

3. Find the exact value of each expression:

a) $\cos 77° \cos 43° - \sin 77° \sin 43°$

b) $\sin 172° \cos 53° + \sin 53° \cos 172°$

c) $\cos 122° \cos 178° + \sin 178° \sin 122°$

4. Express the following as a single trigonometric expression:

a) $\sin(35°)\cos 18° + \cos 35° \sin 18°$	b) $\cos 67° \cos 31° - \sin 67° \sin 31°$
c) $\frac{\sqrt{3}}{2}\cos\theta + \frac{1}{2}\sin\theta$	d) $-\frac{1}{2}\sin\theta + \frac{\sqrt{3}}{2}\cos\theta$
e) $\frac{\sqrt{3} + \tan\theta}{1 - \sqrt{3}\tan\theta}$	f) $\frac{1 + \tan\theta}{1 - \tan\theta}$

5. Given that angle "a" is in quadrant 1 and angle "b" is in quadrant 2, If $\sin a = \frac{3}{5}$ and $\sin b = \frac{2}{5}$, then what is the value of $\sin(a+b)$? $\sin(a-b)$?

6. Given that angle "a" is in quadrant 2 and angle "b" is in quadrant3, If $\sin a = \frac{2}{3}$ and $\cos b = -\frac{3}{4}$, then what is the value of $\cos(a+b)$? $\cos(a-b)$?

7. Given that angle "a" is in quadrant 2 and angle "b" is in quadrant 4, If $\tan a = -\frac{5}{7}$ and $\tan b = \frac{-5}{6}$, then what is the value of $\sin(a+b)$? $\cos(a+b)$?

8. Determine the angle "x" such that it satisfies the equation:

   a. $\sin(38° + x) = \frac{\sqrt{2}}{2}$

   b) $\cos x \cos 10° - \sin x \sin 10° = 0.5$

9. Use the double angle properties to prove that: $\sin 2x = 2\sin x \cos x$

10. Use the double angle properties to prove that: $\cos 2x = 2\cos^2 x - 1$

11. Use the double angle properties to prove that: $\cos 2x = 1 - 2\sin^2 x$

12. Prove that $\sin(45° + x) + \sin(45° - x) = \sqrt{2}\cos x$

13. Simplify: $\cos(30° + x) \times \cos(30° - x) - \sin(30° + x) \times \sin(30° - x)$

14. If angle "a" is in quadrant 2 and $\sin a = \frac{1}{3}$, then what is the exact value of $\sin(2a)$?

15. Simplify: $\cos(x + 90°) - \cos(x - 90°)$

16. Find the ordered pair (x,y) for which in triangle ABC, $\sin A : \sin B : \sin C = 4 : 5 : 6$, which the ratio of $\cos A : \cos B : \cos C = x : y : 2$