Trigonometric identities

1. $\cos^2 x + \sin^2 x = 1$
2. $\sin 2x = 2\sin x \cos x$
3. $\cos 2x = \cos^2 x - \sin^2 x$
4. $\cos\ x + \cos\ y = 2\cos\ \frac{x+y}{2} \cos\ \frac{x-y}{2}$
5. $\cos\ x - \cos\ x = -2\sin\ \frac{x+y}{2} \sin\ \frac{x-y}{2}$
6. $\sin\ x + \sin\ y = 2\sin\ \frac{x+y}{2} \cos\ \frac{x-y}{2}$
7. $\sin\ x - \sin\ y = 2\cos\ \frac{x+y}{2} \sin\ \frac{x-y}{2}$
8. $\cos ax \cos bx = \frac{1}{2}\left(\cos(a+b)x + \cos(a-b)x\right)$
9. $\sin ax \sin bx = -\frac{1}{2}\left(\cos(a+b)x - \cos(a-b)x\right)$
10. $\sin ax \cos bx = \frac{1}{2}\left(\sin(a+b)x + \sin(a-b)x\right)$
11. $\sin^2 x = \frac{1-\cos 2x}{2}$
12. $\cos^2 x = \frac{1+\cos 2x}{2}$