HW #5.4-1 p. 605

5) $\frac{1}{2}\left[\cos 4x - \cos 8x\right]$

6) $\frac{1}{2}\left[\cos 4x - \cos 12x\right)$

7) $\frac{1}{2}\left[\cos 4x + \cos 10x\right]$

8) $\frac{1}{2}\left[\cos 7x + \cos 11x\right]$

9) $\frac{1}{2}\left[\sin 3x - \sin x\right]$

10) $\frac{1}{2}\left[\sin 5x - \sin x\right]$

11) $\frac{1}{2}\left[\sin 2x - \sin x\right]$

12) $\frac{1}{2}\left[\sin 3x - \sin 2x\right]$

FIND VALUE

18) $\sin 8x + \sin 2x = \boxed{2\sin 5x \cos 3x}$

21) $\cos 4x + \cos 2x$

$\boxed{2\cos 3x \cos x}$

24) $\sin x - \sin 2x = \boxed{-2\sin\frac{x}{2}\cos\frac{3x}{2}}$

27) $\sin 75^\circ + \sin 15^\circ$

$2\sin 45^\circ \cos 30^\circ$

$\boxed{\frac{\sqrt{6}}{2}}$

30) $\cos\frac{\pi}{12} - \cos\frac{5\pi}{12} = -2\sin\frac{\pi}{4}\sin\left(-\frac{\pi}{6}\right)$

$\boxed{\frac{\sqrt{2}}{2}}$

VERIFY

31) $\frac{\sin 3x - \sin x}{\cos 3x - \cos x} = -\cot 2x$

$\frac{\cancel{2\sin x}\cos 2x}{-\cancel{2}\sin 2x\,\cancel{\sin x}}$

$\frac{\cos 2x}{-\sin 2x}$

$-\cot 2x$

33) $\frac{\sin 2x + \sin 4x}{\cos 2x + \cos 4x} = \tan 3x$

$\frac{\cancel{2}\sin 3x\,\cos(-x)}{\cancel{2}\cos 3x\,\cancel{\cos}(-x)}$

$\tan 3x$

35) $\frac{\sin x - \sin y}{\sin x + \sin y} = \tan\left(\frac{x-y}{2}\right)\cot\left(\frac{x+y}{2}\right)$

$\frac{\cancel{2}\cos\left(\frac{x+y}{2}\right)\sin\left(\frac{x-y}{2}\right)}{\cancel{2}\sin\left(\frac{x+y}{2}\right)\cos\left(\frac{x-y}{2}\right)}$

$\cot\left(\frac{x+y}{2}\right)\tan\left(\frac{x-y}{2}\right)$

37) $\frac{\sin x + \sin y}{\cos x + \cos y} = \tan\left(\frac{x+y}{2}\right)$

$\frac{\cancel{2}\sin\left(\frac{x+y}{2}\right)\cancel{\cos\left(\frac{x-y}{2}\right)}}{\cancel{2}\cos\left(\frac{x+y}{2}\right)\cancel{\cos\left(\frac{x-y}{2}\right)}}$

$\tan\left(\frac{x+y}{2}\right)$

60) $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha$

$+\ \sin(\alpha-\beta) = \sin\alpha\cos\beta - \sin\beta\cos\alpha$

$\sin(\alpha+\beta) + \sin(\alpha-\beta) = 2\sin\alpha\cos\beta \longrightarrow \boxed{\frac{1}{2}\left[\sin(\alpha+\beta)+\sin(\alpha-\beta)\right] = \sin\alpha\cos\beta}$