VD 5.5.2

Part 1

Rewrite the following expressions into a product form

1. $\sin 5x - \sin x$	$2\cos 3x \sin 2x$
2. $\cos x + \cos 7x$	$2\cos 4x \cos 3x$
3. $\sin 4x + \sin 8x$	$2\sin 6x \cos 2x$
4. $\cos 4x - \cos 6x$	$2\sin x \sin 5x$
5. $\sin\left(3x - \dfrac{1}{4}\pi\right) + \sin\left(3x + \dfrac{\pi}{6}\right)$	$2\sin\left(3x - \dfrac{\pi}{24}\right)\cos\dfrac{5\pi}{24}$
6. $\cos(x + \dfrac{\pi}{5}) - \cos(x - \dfrac{\pi}{5})$	$-2\sin x \sin\dfrac{\pi}{5}$
7. $\sin\left(\pi + 2x\right) - \sin(2\pi + 6x)$	$-2\sin 4x \cos 2x$

Part 2

Solve the following trigonometric equations if $x \in [0, 2\pi)$

1. $\cos 2x - \cos 6x = 0$	$0, \dfrac{\pi}{4}, \dfrac{\pi}{2}, \dfrac{3\pi}{4}, \pi, \dfrac{5\pi}{4}, \dfrac{3\pi}{2}, \dfrac{7\pi}{4}$
2. $\sin 6x + \sin 2x = 0$	$0, \dfrac{\pi}{4}, \dfrac{\pi}{2}, \dfrac{3\pi}{4}, \pi, \dfrac{5\pi}{4}, \dfrac{3\pi}{2}, \dfrac{7\pi}{4}$
3. $\dfrac{\cos 2x}{\sin 3x - \sin x} - 1 = 0$	$\dfrac{\pi}{6}, \dfrac{\pi}{4}, \dfrac{3\pi}{4}, \dfrac{5\pi}{6}, \dfrac{5\pi}{4}, \dfrac{7\pi}{4}$
4. $\sin^2 3x - \sin^2 x = 0$	$0, \dfrac{\pi}{2}, \pi, \dfrac{3\pi}{2}$
5. $\sin\left(2x - \dfrac{\pi}{2}\right) + \sin\left(2x + \dfrac{\pi}{3}\right) = 0$	$\dfrac{\pi}{24}, \dfrac{13\pi}{24}, \dfrac{25\pi}{24}, \dfrac{37\pi}{24}$
6. $\sin\dfrac{x}{2} + \cos x = 0$	π
7. $\cos\dfrac{x}{2} - \sin x = 0$	$\dfrac{\pi}{3}, \pi, \dfrac{5\pi}{3}$