17. cont.

e) $\sin 130° - \sin 40° =$

$= 2\cos\frac{130°+40°}{2}\sin\frac{130°-40°}{2}$

$= 2\cos 85°\sin 45°$

$= 2\frac{\sqrt{2}}{2}\cos 85°$

$= \sqrt{2}\cos 85°$

f) $\cos 4x - \cos 2x =$

$= -2\sin\frac{4x+2x}{2}\sin\frac{4x-2x}{2}$

$= -2\sin 3x \sin x$

18.

a) $\sin(x-30°) =$

$= \sin x\cos 30° - \sin 30°\cos x$

$= \sin x\frac{\sqrt{3}}{2} - \frac{1}{2}\cos x$

$\cos(60°-x) =$

$= \cos 60°\cos x + \sin 60°\sin x$

$= \frac{1}{2}\cos x + \frac{\sqrt{3}}{2}\sin x$

$\therefore$

$\frac{\sin(x-30°) + \cos(60°-x)}{\sin x} =$

$= \frac{\frac{\sqrt{3}}{2}\sin x - \frac{1}{2}\cos x + \frac{1}{2}\cos x + \frac{\sqrt{3}}{2}\sin x}{\sin x}$

$= \frac{\sqrt{3}\sin x}{\sin x} = \sqrt{3}$

b) $\operatorname{tg}\left(\frac{\pi}{4}-x\right) = \frac{\operatorname{tg}\frac{\pi}{4} - \operatorname{tg} x}{1 + \operatorname{tg}\frac{\pi}{4}\operatorname{tg} x}$

$= \frac{1-\operatorname{tg} x}{1+\operatorname{tg} x}$

$\operatorname{tg}\left(\frac{\pi}{4}+x\right) = \frac{\operatorname{tg}\frac{\pi}{4} + \operatorname{tg} x}{1 - \operatorname{tg}\frac{\pi}{4}\operatorname{tg} x}$

$= \frac{1+\operatorname{tg} x}{1-\operatorname{tg} x}$

$\therefore$

$\frac{\operatorname{tg}\left(\frac{\pi}{4}-x\right) - \operatorname{tg}\left(\frac{\pi}{4}+x\right)}{\operatorname{tg} x} =$

$= \frac{\frac{1-\operatorname{tg} x}{1+\operatorname{tg} x} - \frac{1+\operatorname{tg} x}{1-\operatorname{tg} x}}{\operatorname{tg} x}$

$= \frac{(1-\operatorname{tg} x)^2 - (1+\operatorname{tg} x)^2}{(1-\operatorname{tg}^2 x)\operatorname{tg} x}$

$= \frac{1 - 2\operatorname{tg} x + \operatorname{tg}^2 x - 1 - 2\operatorname{tg} x - \operatorname{tg}^2 x}{(1-\operatorname{tg}^2 x)\operatorname{tg} x}$