.27.

a) $\cos 2(2x) =$

$= \cos^2 2x - \sin^2 2x$ (*)

→ ou usando que

$\cos^2 2x = 1 - \sin^2 2x$

podemos por ainda

(*) $= \cos^2 2x - \sin^2 2x$

$= 1 - \sin^2 2x - \sin^2 2x$

$= 1 - 2\sin^2 2x$

→ ou ainda usando que

$\sin^2 2x = 1 - \cos^2 2x$

temos também

(*) $= \cos^2 2x - \sin^2 2x$

$= \cos^2 2x - (1 - \cos^2 2x)$

$= 2\cos^2 2x - 1$

∴

$$\boxed{\begin{aligned} \cos 4x &= \cos^2 2x - \sin^2 2x \\ &\text{ou} \\ &= 1 - 2\sin^2 2x \\ &\text{ou} \\ &= 2\cos^2 2x - 1 \end{aligned}}$$

b) $\sin 3x = \sin\left(2\,\frac{3}{2}x\right)$

$= 2\sin\frac{3}{2}x\,\cos\frac{3}{2}x$

c) $\operatorname{tg} 6x = \operatorname{tg} 2(3x)$

$= \dfrac{2\operatorname{tg} 3x}{1 - \operatorname{tg}^2 3x}$

d) $\sin\frac{1}{2}x = \sin 2\,\frac{1}{4}x$

$= 2\sin\frac{1}{4}x\,\cos\frac{1}{4}x$

e) $\cos\frac{2}{3}x = \cos 2\,\frac{x}{3}$

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

f) $\operatorname{tg}(-7x) = -\operatorname{tg} 7x$

$= -\operatorname{tg}\left(2\,\frac{7}{2}x\right)$

$= -\dfrac{2\operatorname{tg}\frac{7}{2}x}{1 - \operatorname{tg}^2\frac{7}{2}x}$