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8) $\dfrac{\cos 3x}{\cos x} = 1 - 4\sin^2 x$ $\left\{ \begin{array}{l} 1-2\sin^2 x \\ 2\sin x\cos x \end{array} \right\}$ Double Angle Formulas

$\Rightarrow \dfrac{\cos(2x+x)}{\cos x} = \dfrac{\cos 2x\cos x - \sin 2x\sin x}{\cos x}$

$\Rightarrow \dfrac{(1-2\sin^2 x)\cancel{\cos x} - \overbrace{2\sin x\cancel{\cos x}\sin x}^{2\sin^2 x}}{\cancel{\cos x}} = \boxed{1-4\sin^2 x}$

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11) $\left(x^3+3x^2+3x+1\right)^{-2/3} = \dfrac{1}{\left(x^3+3x^2+3x+1\right)^{2/3}}$

1
$1 \quad 1$
$1 \quad 2 \quad 1$
$1 \quad 3 \quad 3 \quad 1$

$= \dfrac{1}{\left((x+1)^3\right)^{2/3}} = \dfrac{1}{(x+1)^2}$

$(a+b)^n$

$(x+1)^2 = x^2+2x+1$

$(x+1)^3 =$

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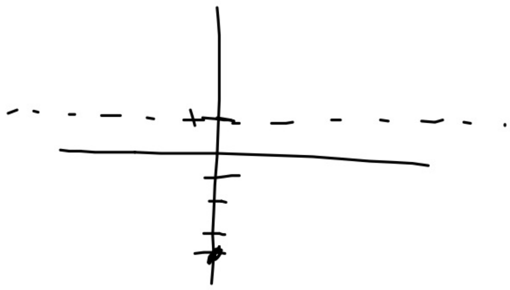
b) $\frac{x^2-4x-4}{x^2+1} > 0$ on $[0, 8]$



① $x^2-4x+4>0$ and $x^2+1>0$

$2\pm2\sqrt{2}$ $\quad x>2+2\sqrt{2}$ $\quad \mathbb{R}$

$(-\infty, \infty)$

$\cancel{x<2-2\sqrt{2}}$

$2+2\sqrt{2}\le x\le 8$

② $\cancel{x^2-4x+4<0}$ ~~and~~ $\cancel{x^2+1<0}$

$\cancel{x<2+2\sqrt{2}}$ $\quad \cancel{\varnothing}$

6b) $2\cos^2 x - 1 - \cos x = 0$ $\quad [0, 2\pi)$

$2\cos^2 x - \cos x - 1 = 0$

$(2\cos x + 1)(\cos x - 1) = 0$

$\cos x = -\frac{1}{2}$, $\cos x = 1$

$x = \frac{2\pi}{3}, \frac{4\pi}{3}$ $\quad x = 0$

b) $\dfrac{\sin^3 x+\cos^3 x}{\sin x+\cos x}=1-\sin x\cos x$ $\quad a^3+b^3=(a^2-ab+b^3)$,

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$$\Rightarrow \frac{\cancel{(\sin x+\cos x)}(\sin^2 x-\sin x\cos x+\cos^2 x)}{\cancel{\sin x+\cos x}}$$

$$=1-\sin x\cos x.$$

$x^6+1=(x^2)^3+1^3$

$$\boxed{(x^2+1)(x^4-x^2+1)}$$