noch aus dem Unterricht

Aufg.: $\int_{-\pi}^{\pi} \cos(3x)$ mit GTR ⟶

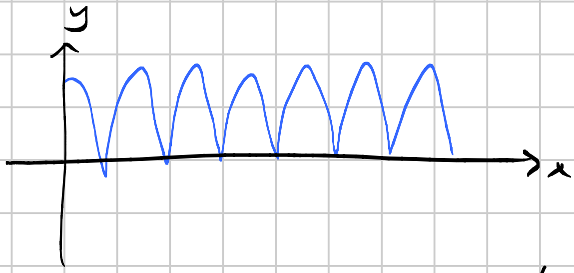
[Window im x-Bereich mind. $[-\pi;\pi]$
evtl. Zoom: 0: zoomFit]

1.) \Y1 = abs (cos 3x)

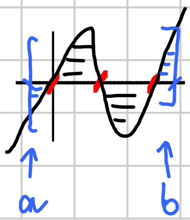
2.) $\boxed{2nd}$ $\boxed{CALC}$ $\boxed{7: \int f(x)\,dx}$

3.) Lower Limit $-\pi$, upper Limit π
(-)

4.) Erg.: $A = 4$



HA: 1) $\int_{-2}^{3} (x^3 - 2x^2)\,dx$! mehrere Nullstellen 3
mehrere Teilflächen 1-4 ⟶ je nachdem, ob Nst. $\in [a;b]$



2.) $\int_{-1}^{4} (x^2 - 4x + 3)\,dx$

① $\boxed{1.}$ Nullstellen: $x^3 - 2x^2 = 0$

$$x^2(x-2) = 0 \qquad x_1 = 0;\ x_2 = 2 \quad \text{beide} \in [-2;3]$$

$\boxed{2.}$ Teilflächen: $A_1: \int_{-2}^{0} (x^3 - 2x^2)\,dx = \left[\frac{1}{4}x^4 - \frac{2}{3}x^3\right]_{-2}^{0}$

$$= 0 - \left(4 + \frac{16}{3}\right) = -\frac{12}{3} - \frac{16}{3} = -\frac{28}{3} \Rightarrow A_1 = \frac{28}{3}$$

$$A_2: \left[\frac{1}{4}x^4 - \frac{2}{3}x^3\right]_0^2 = \frac{12}{3} - \frac{16}{3} = -\frac{4}{3} \Rightarrow A_2 = \frac{4}{3}$$

$$A_3: \left[\frac{1}{4}x^4 - \frac{2}{3}x^3\right]_2^3 = \frac{81}{4} - \frac{54}{3} - \left(-\frac{4}{3}\right) = \frac{43}{12}$$

$\boxed{3.}$ $A_{ges} = A_1 + A_2 + A_3 = \frac{171}{12} = \frac{56}{4} \underline{\underline{= 14{,}25}}$

② $\int_{-1}^{4} (x^2 - 4x + 3)\,dx$

1. Nullstellen: $x^2 - 4x + 3 = 0$; $x_{1,2} = \frac{4 \pm \sqrt{16-12}}{2}$ $\quad x_1 = 3$, $x_2 = 1$ $\Big\}$ beide $\in [-1;4]$

2. Teilflächen: A_1: $\int_{-1}^{1} (x^2 - 4x + 3)\,dx = \left[\frac{1}{3}x^3 - 2x^2 + 3x\right]_{-1}^{1}$

$= \frac{1}{3} - 2 + 3 - \left(-\frac{1}{3} - 2 - 3\right) = 6\frac{2}{3}$

A_2: $\left[\frac{1}{3}x^3 - 2x^2 + 3x\right]_{1}^{3} = 9 - 18 + 9 - \left(\frac{1}{3} - 2 + 3\right)$

$= -\frac{4}{3} \Rightarrow A_2 = \frac{4}{3}$

A_3: $\left[\frac{1}{3}x^3 - 2x^2 + 3x\right]_{3}^{4} = \frac{64}{3} - 32 + 12 - 0 = \frac{4}{3}$

$A_{ges} = 6\frac{2}{3} + \frac{4}{3} + \frac{4}{3} = \underline{\underline{9\frac{1}{3}}}$