C. 1. $\int \frac{\sin x}{1+\cos^2 x}$ 2. $\int_{-\pi}^{1} xe^{-x}\ dx$
3. $y = x-1$ és $y = \log_2 x$ közti terület. 4. $\int_{-\infty}^{2} \frac{2}{(x-2)^2}\ dx$

Megoldások vázlata:
C1. $y = \cos x$ helyettesítéssel:

$$\begin{aligned} \int \frac{\sin x}{1+\cos^2 x}dx &= \int \frac{\sin x}{1+y^2}\cdot\frac{dy}{-\sin x} && (\text{ 2 pont }) \\ &= -\int \frac{1}{1+y^2} = -\arctan y && (\text{ 2 pont }) \\ &= -\arctan(\cos x) && (\text{ 1 pont }) \end{aligned}$$

C2.

$$\begin{aligned} \int xe^{-x} &= x\cdot\frac{e^{-x}}{-1} - \int 1\cdot\frac{e^{-x}}{-1} = -(x+1)e^{-x} && (\text{ 2 pont }) \\ \int_{-\pi}^{1} xe^{-x}\ dx &= \left[-(x+1)e^{-x}\right]_{-\pi}^{1} && (\text{ 1 pont }) \\ &= (1-\pi)e^{\pi} - \frac{2}{e} && (\text{ 2 pont }) \end{aligned}$$

C3.

$$\begin{aligned} x-1 &= \log_2 x = \frac{\log x}{\log 2} \\ x &= 1 \quad \text{és} \quad x = 2 && (\text{ 1 pont }) \\ \int \left(x-1-\frac{\log x}{\log 2}\right) &= \frac{x^2}{2} - x - \frac{1}{\log 2}\int \log x \\ \int \log x &= \int 1\cdot\log x = x\log x - \int x\cdot\frac{1}{x} \\ &= x(\log x - 1) && (\text{ 1 pont }) \\ \int \left(x-1-\frac{\log x}{\log 2}\right) &= \frac{x^2}{2} - x - \frac{x(\log x-1)}{\log 2} && (\text{ 1 pont }) \\ \int_1^2 \left(x-1-\frac{\log x}{\log 2}\right)dx &= \left[\frac{x^2}{2} - x - \frac{x(\log x-1)}{\log 2}\right]_1^2 && (\text{ 1 pont }) \\ &= \frac{1}{\log 2} - \frac{3}{2} && (\text{ 1 pont }) \end{aligned}$$

C4.

$$\int \frac{2}{(x-2)^2} = 2\int (x-2)^{-2} = 2\cdot\frac{(x-2)^{-1}}{-1} = \frac{2}{2-x} \qquad (\text{ 2 pont })$$

$$\int_a^b \frac{2}{(x-2)^2}\,dx = \left[\frac{2}{2-x}\right]_a^b = \frac{2}{2-b} - \frac{2}{2-a} \qquad (\text{ 1 pont })$$

$$\lim_{a\to-\infty} \frac{2}{2-a} = 0 \qquad \lim_{b\to 2^-} \frac{2}{2-b} = +\infty \qquad (\text{ 1 pont })$$

$$\int_{-\infty}^2 \frac{2}{(x-2)^2}\,dx = +\infty \qquad (\text{ 1 pont })$$