C) $\int \frac{2}{2x^2+3x+1}dx$ $= \int \frac{4}{2x+1} + \frac{-2}{x+1}$

$\frac{2}{(2x+1)(x+1)} = \frac{A(x+1)}{(2x+1)(x+1)} + \frac{B(2x+1)}{(x+1)(2x+1)}$

$2 = A(x+1) + B(2x+1)$

$x=-1 \quad 2=-B \quad B=-2$

$x=-\frac{1}{2} \quad 2=\frac{1}{2}A \quad A=4$

$= 2\ln|2x+1| - 2\ln|x+1| + C$

$\ln\left|\frac{(2x+1)^2}{(x+1)^2}\right| + C$

$\ln\left(\frac{2x+1}{x+1}\right)^2 + C$

D) $\int \frac{x^3-5}{x^2-1}dx$ $= \int x + \frac{3}{x+1} - \frac{2}{x-1}$

$\frac{1}{2}x^2 + 3\ln|x+1| - 2\ln|x+1| + C$

$\frac{1}{2}x^2 + \ln\left|\frac{(x+1)^3}{(x-1)^2}\right| + C$

Since the ~~power~~ degree on bottom is not bigger than the top
- start with long division

$$\begin{array}{r} x \\ x^2-1 \overline{)\,x^3-5} \\ \underline{-x^3+x} \\ x-5 \end{array}$$

$\frac{x^3-5}{x^2-1} = x + \frac{x-5}{x^2-1}$

$\frac{x-5}{(x+1)(x-1)} = \frac{A(x-1)}{(x+1)(x-1)} + \frac{B(x+1)}{(x-1)}$

$x-5 = A(x-1) + B(x+1)$

$x=1 \quad -4=2B \quad B=-2$

$x=-1 \quad -6=-2A \quad A=3$

	$E)\ \mathrm{f}'(\mathrm{x}) = \dfrac{2x^3}{x^3 - x}$