FALL 2026 - CALCULUS 2 - TEST #3A

20 minutes, no references, last few are tricky

True or false:

F 1) The formula for integration by parts is $\int udu - \int vdv = uv$

F 2) The formula for integration by parts is $-\int vdu = \int udv + uv$

F 3) $\int \sin^3 x dx$ can be integrated as a power function by first rewriting it as $\int \sin^2 x d(\sin x)$

F 4) $\int \sqrt{a^2 + x^2}\, dx$ may be simplified by setting $x = a\sin\theta$

T 5) $\int \sqrt{a^2 + x^2}\, dx$ may be simplified by setting $x = a\sinh u$

T 6) $\int \frac{xdx}{\sqrt{x^2+1}}$ may be simplified by setting $u = x^2 + 1$

F 7) $\int \frac{dx}{\sqrt{x^2+1}}$ may be simplified by setting $u = x^2 + 1$

T 8) $\int \frac{dx}{\sqrt{x^2-1}}$ may be simplified by setting $x = \cosh u$

T 9) $\tan x = \sqrt{\frac{1-\cos 2x}{1+\cos 2x}}$

F 10) Rational functions are continuous except where the numerator is zero

T 11) The partial fraction decomposition of $\frac{x^2+5x-11}{x^2(x^2+1)^3}$ would consist of five terms

T 12) The partial fraction decomposition of $\frac{x^2+5x-11}{x^2(x^2+1)^3}$ would have 8 constants to be determined

F 13) The partial fraction decomposition of $\frac{1}{(x^4-1)}$ would have the form $\frac{A}{(x^2-1)} + \frac{Bx+C}{(x^2+1)}$

F 14) $\frac{(x^2-4)(x+2)}{(x-2)(x^2+4x+4)}$ must be integrated by the partial fraction method

T 15) $\int x^5 \sin x dx$ can be integrated using the tabular method

T 16) $\int (\sin x)(x^3)(\cos x)dx$ can be integrated using the tabular method

F 17) $\int \ln x dx$ can be integrated using substitution

F 18) $\int \frac{dx}{x\ln x}$ can be integrated using integration by parts

T 19) $\int \ln x \cdot \sin^2 x dx + \int \ln x \cdot \cos^2 x dx = x\ln x - x + C$

F 20) $\int \sin^4 x \cos^2 x dx$ can be done by factoring out one power of $\sin x$ to form $d(\cos x)$

T 21) $\int (\tan^2 x - 2)dx = \int \sec^2 x dx - 3 + C$

F 22) $\int \frac{dx}{1+x^2} = \frac{\arcsin x}{\arccos x}$

F 23) $\int_{-1}^{1} x^3 \sin x dx = 0$

F 24) $\int \tan x \sec^2 x dx = \frac{1}{2}(\sec^2 x - 1)^2 + C$

T 25) $\int \frac{e^{\tan x} dx}{\cos^2 x} = e^{\tan x} + C$