WUA4N

late
10/22
(1)

T/F Review:

The formula for integration by parts is:

F 1) $\int u\,dv - \int v\,du = uv$ $\quad d(uv) = u\,dv + v\,du$

$uv = \int u\,dv + \int v\,du$

obv hard easy

T 2) $-\int v\,du = \int u\,dv - uv$

T 3) $\int \sin^3 x\,dx$ can be integrated as a power function

$\sin x\,dx = -d(\cos x)$

T 4) $\sqrt{a^2+x^2}$ may be simplified using $x = a\tan\theta$

T 5) $\sqrt{a^2+x^2}$ " " " " $x = a\cdot\sinh x$

T 6) $\int \frac{x\,dx}{\sqrt{x^2+1}}$ " " " " $u = x^2+1$

F 7) $\int \frac{dx}{\sqrt{x^2+1}}$ " " " " $u = x^2+1$

T 8) $\int \frac{dx}{\sqrt{x^2+1}}$ " " " " $x = \sinh u$

$x = \sinh u \quad x^2+1 : \sinh^2 u + 1 = \cosh^2 u$

$\int \frac{\cosh u \, du}{\cosh u} \longrightarrow dx = \cosh u \, du$

F 9) $\sin^2 x = \sqrt{\frac{1-\cos 2x}{2}}$

T 10) rational functions are continuous if the denominator does not have a zero

$r(x) = \frac{P(x)}{Q(x)} \leftarrow \qquad \frac{1}{x(x+1)}$

T 11) PFD $\frac{x^2+5x-11}{x^2(x+1)^3}$ has 5 terms

F 12) PFD $\frac{x^2-2x+1}{x^2(x-1)^3}$ has 5 terms

$\frac{1}{x \cdot x \cdot (x^2+1)} \qquad \frac{1}{x^2(x-1)} = \frac{A}{x} + \frac{B}{x^2} + \frac{C}{x-1}$

F 13) PFD of $\frac{1}{(x^2+1)(x-1)}$ would have form

$\frac{A}{x-1} + \frac{B}{x^2+1}$ ← $Bx+C$ then true

(3)

F 14) $\frac{(x^2-4)(x+2)}{(x-2)(x^2+4x+4)}$ $(x-2)(x+2)$ $= 1$ must be integrated via PFD

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

T 15) $\int x^5 \sin 2x\,dx$ can be integrated via tab int

16) $\int e^{3x}\cos 4x\,dx$ " " " " " "

$$\int e^x \cos x\,dx$$

d/dx	∫dv
e^x +	$\cos x$
e^x −	$\sin x$
e^x	$-\cos x$
e^x	

$$\int e^x \cos x\,dx = e^x(-\sin x) + e^x(-\cos x) - \int e^x \cos x\,dx$$

$$\int e^x \cos x\,dx = \frac{-e^x(\sin x + \cos x)}{2}$$

$\int e^{cx}dx = \frac{e^{cx}}{c}$

T (17) $\int_1^2 \ln x\,dx$ can be integrated by parts

$x\ln x - \int x\frac{1}{x}dx = x\ln x - x$

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

$u = \ln x \quad du = \frac{1}{x}dx$

$\hookrightarrow \int \frac{du}{u} = \ln u \rightarrow \ln(\ln x)$

T (19) $\int e^{2x}\sin^2 x\,dx + \int e^{2x}\cos^2 x\,dx = \frac{e^{2x}}{2} + C$

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

T (21) $\int(\tan^2 x - 1)dx = \int(\sec^2 x - 2)dx$

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

$\cos(-x) = \cos x$

$\sin(-x) = -\sin x$

T (23) $\int_{-1}^{1} x^3\cos x\,dx = 0$

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

$\downarrow$

T (*) $\frac{\tan^2 x}{2} = \frac{1}{2}(\sec^2 x - 1)$

25) $\int e^{\sin x} \cos x \, dx = e^{\sin x} + C$

$\int e^u \, du = e^u$

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1 ea. Partial Integration

Trig $\int$'s

Magic Δ's

PFD

$\frac{1}{x^{\mp}(x+1)}$