OLL Sec 7.1 Wed, January 15, 2020 Section 7.1 Integration by parts Integration by parts comes from the product rule, d ((x) g (x) = f (x) g'(x) + g(x) f'(x) Jakengerdex = Stexing (x) dx + Sgex) f(x) dx fox)g(x)dx = S fox)g(x)dx+ Sg(x) f(x)dx S f(x)g(x) dx = f(x)g(x) - S g(x) f'(x)dx Letting u=f(x), V=g(x) The formula for integration by ports is

Sudv = uv - Svder EX I = Sxcosxdx dr=cosxdx v=sinX I = xsinx - Ssinxolx = XSinx + cosx + C Check of [xsinx+cosx+c] = sinx +xcos x -sin +0 = X609X

Wed, Jen 15, 2020 Sec 7.1 I = Slnxdx = S((nx)(1)dx u=lnx dv=dx del = x dx V = X $I = x(nx - S(\frac{1}{x})xox = x(nx - Sox = x(nx - X + C)$ EX I = Sxexax u=x $dv=e^{x}dx$ du=ox $v=e^{x}$ I=xex-Sexax=xex-ex+C EX I= Sx2exdx $u=X^2$ $dv=e^{x}ax$ du= 2xdx J=ex I = x2ex-25xexdx Now use Int by parts a second time. This was done above T = X2ex-2[xex-ex+ci] I = x2x-2xex+2ex+c, where c=-2c,

See 7.1 Wed, Jan 15, 2020 Ex Find Steer xdx Solution livest find I = Sten X dx U=ten'X dV=dX du= dx 14/2 So I = (xtan x) Six dx now find Sitx2 dx det = 1+x2

det = 2xax Six2dx = 2 Saxdx 1+x2 = \frac{1}{2} \frac{1}{2} = \left[\left[\frac{1}{2} \right] = \frac{1}{2} \left[\frac{1}{2} \right] = \frac{ 50 Sten-1x0= xten-1x - \(\frac{1}{2}\langle (1+x^2) + C $\int_{0}^{1} \tan^{-1} x \, dx = \left(x \tan^{-1} x\right) \Big|_{x=0}^{x=1} \left(x + \tan^{-1} x\right) \Big|_{x=0}^{x=1}$ = [i(\frac{1}{4})-o(0)] + \frac{1}{2} [(n(i+i)-(n(i+o))] $= \left(\frac{1}{4} - 0. \right) + \frac{1}{2} \left[\left(\ln 2 \right) - 0 \right]$

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022 Sec 7.1 Wed Jan 15,2020 Ex Find I = Sexsinxdx u=sinx du=cosxdx v=ex du=cosxdx So I = exsinx - Sexcosxdy now find I2 = Sexcosxdx $u=\cos x$ $du=-\sin x dx$ $v=e^{x}dx$ $du=-\sin x dx$ I2 = etcosx + Sexsinxdx So I = Setsinxdx = etsinx - (excorx + Setsinx dx) Setsinxdx = etsinx-etcosx-Setsinxdx + Sexsinkak +Setsiuxox 2Sexsinxdx = exsinx-excosx +c1 So Setsinxox = 2 [etsinx-etcosx+ci] = 1 etessk+ersinx-exosk+ersinx+0 Check de [1/exsinx-excosx)] = = [etsinx+etsinx] = \frac{1}{2} [zetsinx] = exsinx