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COURSE CODE: MAT 104

Assignment

1. ∫2x2 Inx

 Let U = Inx dv = 2x2

 du = 1/x dx V = 2/3 x3

 ∫U dv = UV - ∫V du

 ∫2x2 Inx = Inx \* 2/3 x3 - ∫2/3 x3 \* 1/x dx

 ∫2x2 Inx = 2/3 x3 Inx - 2/3 ∫x3 \* 1/x dx

 = 2/3 x3 Inx - 2/3 ∫x2dx

 = 2/3 x3 Inx - 2/3 (x3 /3) + C

 = 2/3 x3 Inx - 2/9 x3 + C

1. ∫3t e2t

 U = 3t dv = e2t

 du = 3dt V = e2t

 ∫3t e2t = 3t \* e2t  - ∫e2t \* 3dt

 = 3te2t - 3 ∫e2t dt

 ∫3t e2t = 3te2t - 3e2t  + C

1. ∫x2 Sin x

 U = x2 dv = Sin x

 du = 2xdx V = - Cos x

∫x2 Sin x = x2 \* - Cos x - ∫ - Cos x \* 2xdx

 = - x2 Cos x + ∫Cos x \* 2xdx

 ∫Cos x \* 2xdx

 U = 2x du = 2dx

 dv = Cos x V = Sin x

 ∫ Cos x \* 2xdx = 2x \* Sin x - ∫Sin x \* 2

 = 2x Sin x - 2 ∫Sin x

 ∫Cos x \* 2xdx = 2x Sin x + 2 Cos x

 So therefore ∫x2 Sin x = - x2 Cos x + 2x Sin x - 2 Cos x + C

1. ∫Cos 5x Cos 6x

 Cos A Cos B = ½ ( Cos (A + B) + Cos ( A – B ) ) A = 5x, B = 6x

 Cos 5x Cos 6x = ½ ( Cos 11x + Cos ( - x ) )

 ∫Cos 5x Cos 6x = ½ ∫Cos 11x + Cos ( - x )

 = ½ ( ( Sin 11x) / 11 - Sin ( - x) )

 ∫Cos 5x Cos 6x dx = ( Sin 11x ) / 22 - ( Sin ( - x) ) / 2

1. ∫Sin 7x Sin 2x

 Sin A Sin B = ½ ( Sin (A + B) + Sin (A - B) )

 A = 7x, B = 2x

 Sin 7x Cos 2x = ½ (Sin 9x + Sin 5x )

 ∫Sin 7x Cos 2x = ½ ∫Sin 9x + Sin 5x

 = ½ ( ( - Cos 9x) / 9 - ( Cos 5x ) / 5 )

 ∫Sin 7x Cos 2x = - ( Cos 9x) / 18 - ( Cos 5x )/10 + C