***NOBLE ONYEBUCHI OFFOR***

***19/ENG03/019***

***CIVIL ENGONEERING***

***NO 188***

 ***MAT 104***

**Question**

Integrate the following with respect to their variable

1. 3te2t

2. x2sinx

3. Sin7xcos2x

4. (2x-3x2) / 1-x

Solutions;

1. ∫3te2t dt

∫udv = uv - ∫vdu

U = 3t dv = e2t

du/dt = 3 v = e2t

du = 3dt

Substituting values into formula

∫3te2t = 3te2t/2 - ∫3e2tdt/2

 3te2t/2 - 3e2t/2

 3e2t(t-1)/2 + c

1. x2sinx

u = x2 dv = sinx

du/dx = 2x v = -cosx

du = 2xdx

using uv - ∫vdu

x2-cosx - ∫-cos2xdx

x2cosx + ∫cosx2xdx

**second integration;**

u = 2x dv = cosx

du/dx = 2 v = sinx

du = 2dx

2xsinx - ∫sinx2dx

2xsinx - 2∫sinxdx

2xsinx – 2(-cosx)

2xsinx + 2cosx

∫x2sinx = x2cosx + 2xsinx + 2cosx + C

1. ∫sin7xcos2x

∫sinAcosB = ½ [sin(A+B) + sin(A-B)]

 = ½(sin9x + sin5x)

 = ½[-cos9x/9 – cos5x/5]

Hence ∫sin7xcos2x = -cos9x/18 - cos5x/10 + C

1. (2x – 3x2)/1-x

∫(2x – 3x2)/1-x

**Solution, using long division**

 3x + 1

 1 – x 2x – 3x2

3x – 3x2

 -x

 + 1 – x

 1

∫2x – 3x2/1 – x = ∫3x + 1 + ∫1/1-x

 = 3∫x + ∫1 + In (1-x) + C

 = 3x2/2 + x + In (1-x) + C