

QUIZ#3 Math102-sec01.

Net Time Allowed: 20 minutes

Name:

ID #:

section:

Exercise1:

Evaluate the integral:

1. $\int (t+1)e^{-t} dt$

2. $\int e^{2\theta} \sin(3\theta) d\theta.$

solution:

1st $I = \int (t+1)e^{-t} dt = \int t e^{-t} dt + \int e^{-t} dt = \int t e^{-t} dt - e^{-t} + C$

By integration by part: $\begin{cases} u = t \\ v' = e^{-t} \end{cases} \Rightarrow \begin{cases} u' = 1 \\ v = -e^{-t} \end{cases}$

$\Rightarrow I = -t e^{-t} + \int e^{-t} dt - e^{-t} + C = -t e^{-t} - e^{-t} - e^{-t} + C = -t e^{-t} - 2e^{-t} + C$

2nd Set $\begin{cases} u = e^{2\theta} \rightarrow u' = 2e^{2\theta} \\ v' = \sin(3\theta) \rightarrow v = -\frac{1}{3} \cos(3\theta) \end{cases}$ so $J = \int e^{2\theta} \sin(3\theta) d\theta = -\frac{1}{3} e^{2\theta} \cos(3\theta) + \frac{2}{3} \int e^{2\theta} \cos(3\theta) d\theta$

and again by part: $\int e^{2\theta} \cos(3\theta) d\theta = \frac{1}{3} e^{2\theta} \sin(3\theta) - \frac{2}{3} J$

Therefore $J = -\frac{1}{3} e^{2\theta} \cos(3\theta) + \frac{2}{3} \left[\frac{1}{3} e^{2\theta} \sin(3\theta) - \frac{2}{3} J \right]$

$J = \frac{1}{13} e^{2\theta} [2\sin(3\theta) - 3\cos(3\theta)] + C$

Exercise2:

Find $\int \tan^5 \theta \sec^7 \theta d\theta.$

solution:

(See Example 6 p 485)