

Wednesday - January 27, 2016

5.4 Exponential Functions, Part 2: Integration
Directions: Find or evaluate the integral.

Ex.1 $\int e^{-x^4} (-4x^3) dx = \int e^u du = e^u + c$
 $u = -x^4$
 $du = -4x^3 dx$
 $= e^{-x^4} + c$

Ex.2 $\int \ln(e^{2x-1}) dx$
 $\int (2x-1) dx = x^2 - x + c$

Ex.3 $\frac{1}{2} \int e^{\sec 2x} (\sec 2x \tan 2x) dx = \frac{1}{2} \int e^u du$
 $u = \sec 2x$
 $du = 2 \sec 2x \tan 2x dx$
 $= \frac{1}{2} e^u + c$
 $= \frac{1}{2} \sec 2x + c$

Ex.4 $\int \frac{e^{2x} + 2e^x + 1}{e^x} dx$
 $u = -x$
 $du = -1 dx$
 $\frac{x^5}{x^2} = x^3$
 $\int e^x + 2 + e^{-x} dx = e^x + 2x + \int e^{-x} dx + c$
 $= e^x + 2x - e^{-x} + c$

Ex.5 $\frac{1}{2} \int \frac{2e^{2x}}{1+e^{2x}} dx = \frac{1}{2} \int \frac{1}{u} du$
 $u = 1+e^{2x}$
 $du = 2e^{2x} dx$
 $= \frac{1}{2} \ln|u| + c$
 $= \ln|1+e^{2x}| + c$

Ex.6 $-\int_3^4 e^{3-x} dx = -\int_0^{-1} e^u du = [-e^u]_0^{-1}$
 $u = 3-x$
 $du = -1 dx$
 $= -e^{-1} - (-1)$
 $= -\frac{1}{e} + \frac{e}{e}$
④ $u = 3-4 = -1$
③ $u = 3-3 = 0$
 $= \frac{e-1}{e}$

Ex.7 $-\int_{-3}^3 x^2 e^{-x^3/2} dx = -\frac{2}{3} \int e^u du$
 $u = -\frac{x^3}{2}$
 $du = -\frac{3x^2}{2} dx$
 $= -\frac{2}{3} e^{-\frac{x^3}{2}} + c$

5.4 HW Part 2 Integration
P. 349
87-111 odd
113-115 all
117-123 odd
129, 131