

Marshall Math - HW Solutions Course Calculus

#69) $\int 3^x dx = \frac{3^x}{\ln 3} + C$

#70) $\int 4^{-x} dx = \int (\frac{1}{4})^x dx$

$= \frac{1}{\ln(\frac{1}{4})} (\frac{1}{4})^x + C$

$= \frac{4^{-x}}{\ln(4^{-1})} + C$

$= -\frac{4^{-x}}{\ln 4} + C$

#71) $\int_{-1}^2 2^x dx = \frac{2^x}{\ln 2} \Big|_{-1}^2$

$= \frac{1}{\ln 2} [2^2 - 2^{-1}]$

$= \frac{1}{\ln 2} [4 - \frac{1}{2}] = \frac{7}{2 \ln 2} = \frac{7}{\ln 4}$

#72) $\int_{-2}^0 (3^3 - 5^2) dx$

$= \int_{-2}^0 (27 - 25) dx = \int_{-2}^0 2 dx$

$= 2x \Big|_{-2}^0 = 0 - (2)(-2) = 4$

#73) $\int x 5^{-x^2} dx$

Let $u = -x^2$
 $du = -2x dx$

$= -\frac{1}{2} \int 5^u du$

$= (-\frac{1}{2}) (\frac{5^u}{\ln 5}) + C = -\frac{1}{2} \frac{5^{-x^2}}{\ln 5} + C$

$= -\frac{1}{2 \ln 5} 5^{-x^2} + C$

#74) $\int (3-x) 7^{(3-x)^2} dx$

$= -\frac{1}{2} \int 7^u du$

$= -\frac{1}{2} (\frac{7^u}{\ln 7}) + C$

$= -\frac{1}{2 \ln 7} 7^{(3-x)^2} + C$

Let $u = (3-x)^2$
 $du = 2(3-x)(-1) dx$

#75) $\int \frac{3^{2x}}{1+3^{2x}} dx$

Let $u = 1+3^{2x}$
 $du = 2(\ln 3) 3^{2x} dx$

$= \frac{1}{2 \ln 3} \int \frac{(2 \ln 3) 3^{2x}}{1+3^{2x}} dx$

$= \frac{1}{2 \ln 3} \int \frac{1}{u} du = \frac{1}{2 \ln 3} \ln(1+3^{2x}) + C$

#76) $\int 2^{\sin x} \cos x dx$

$u = \sin x$
 $du = \cos x dx$

$= \int 2^u du = \frac{1}{\ln 2} 2^u + C$

$= \frac{1}{\ln 2} 2^{\sin x} + C$