SM 122 GATEWAY SAMPLE Spring 2005-06 Last Name: SOLUTION

Period: 1st 2nd 3rd [CIRCLE ONE]

Time: 10 minutes: Closed book, closed notes, calculator not allowed

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$$\int 7e^{-21r}\,dr \quad = \quad \frac{7}{-21}e^{-21r} \;+\; C = -\frac{1}{3}e^{-21r} \;+\; C$$

$$\int \csc(21s)\cot(21s)\,ds \quad = \quad -\frac{1}{21}\csc(21s) \;+\; C$$

$$\int \frac{1}{21}\sec(21t)\tan(21t)\,dt \quad = \quad \frac{1}{21^2}\sec(21t) + C$$

$$\int 7{\cdot}21^w\,dw \quad = \quad \frac{7\cdot 21^w}{\ln(21)} + C$$

$$\int \frac{7}{21+21z^2}\,dz \quad = \quad \frac{7}{21}\int \frac{1}{1+z^2}\,dz \quad = \quad \frac{1}{3}\arctan(z) + C$$

$$\int \cos(21x)\,dx \quad = \quad \frac{1}{21}\sin(21x) \;+\; C$$

$$\int \sec^2(21v)\,dv \quad = \quad \frac{1}{21}\tan(v) \;+\; C$$

$$\int_0^2 (6p^2{-}5)\,dp \quad = \quad \left(2p^3 - 5p\right)\Big|_0^2 = \left(2\cdot 2^3 - 5\cdot 2\right){-}(0) = 6$$

$$\int \frac{21}{2w+3}\,dw \quad = \quad 21\int \frac{1}{2w+3}\,dw \quad = \quad 21{\cdot}\left(\frac{1}{2}\right)\ln|2w{+}3| \;+\; C$$

$$\int 48xe^{4x}\,dx = 48\int u\,dv = 48uv{-}48\int v\,du = 48x{\cdot}\frac{1}{4}e^{4x}{-}48\int \frac{1}{4}e^{4x}\,dx = 12xe^{4x}{-}3e^{4x}{+}C$$

Integrate by parts: $\left\{\begin{array}{ll} u = x & dv = e^{4x}\,dx \\ du = dx & v = \frac{1}{4}e^{4x} \end{array}\right\}$

$$\int \frac{4}{x(x+2)}\,dx \quad = \quad \int \left(\frac{2}{x} - \frac{2}{x+2}\right)\,dx = 2\ln|x| - 2\ln|x+2| \;+\; C$$

Partial fractions: $\dfrac{4}{x(x+2)} = \dfrac{A}{x}{+}\dfrac{B}{x+2}$ implies $4 = A(x{+}2){+}Bx = (A{+}B)x{+}2A$.

Therefore $A = 2$ and $B = -2$.