Math 132 Exam I SPRING 2001

Part I

1.Find one antiderivative of $f(\theta) = e^{\theta} + \sec^2\theta$.

(A) $e^{\theta} + 2\sec\theta\tan\theta$ (B) $\frac{1}{2}e^{2\theta} + \tan^2\theta$ (C) $e^{\theta} + \tan\theta$

(D) $e^{\theta} + \tan 2\theta$ (E) $\frac{1}{2}e^{2\theta} + \tan\theta$ (F) $\ln\theta + \cos^2\theta$

(G) $\ln\theta + \tan\theta$ (H) $\ln\theta + \tan^{-1}\theta$ (I) 1

(J) $e^{\theta} + \ln|\tan\theta|$

$e^{\theta} + \tan\theta + C$

2. Evaluate

$$\int_2^3 \frac{3x^2-1}{x^3-x}\,dx.$$

(A) 0 (B) $\ln 12$ (C) $\ln 18$ (D) $\ln 4$ (E) $\ln 8$

(F) 1 (G) e^{12} (H) e^{18} (I) e^4 (J) e^8

$u = x^3 - x$ $\quad x = 2 \quad x = 3$

$du = (3x^2-1)\,dx \quad u = 6 \quad u = 24$

$$\int_6^{24} \frac{du}{u} = \ln|u| \Big|_6^{24}$$

$$= \ln 24 - \ln 6$$

$$= \ln \frac{24}{6} = \ln 4$$

3. If $f'(x) = 3x^2 + 2x + 1$ and $f(0) = 0$, find $f(2)$.

(A) 0 (B) 2 (C) 4 (D) 6 (E) 8

(F) 10 (G) 12 (H) 14 (I) 16 (J) 18

$f(x) = x^3 + x^2 + x + C$

$f(0) = 0 + 0 + 0 + C = 0$

$C = 0$

$f(x) = x^3 + x^2 + x$

$f(2) = 8 + 4 + 2 = 14$