

## Mini-Test 2

$$\bar{x} = 10,33$$

Nom :

Solutions

1. (5 points) Calculer  $\int t \sec t \tan t dt$ . (int. par parties)

$$u = t \quad du = \sec t \tan t dt$$

$$dv = dt \quad v = \sec t$$

$$\int = t \sec t - \int \sec t dt$$

$$= \underline{t \sec t - \ln |\sec t + \tan t| + C}$$

2. (5 points) Calculer  $\int \tan^3 \theta d\theta$ . =  $\int \tan^2 \theta \cdot \tan \theta d\theta$

$$= \int (\sec^2 \theta - 1) \tan \theta d\theta$$

$$= \int \overbrace{\sec^2 \theta \tan \theta}^u d\theta - \int \tan \theta d\theta$$

$$= \int u du + \ln |\cos \theta|$$

$$= \frac{u^2}{2} + \ln |\cos \theta| + C$$

$$= \underline{\frac{\tan^2 \theta}{2} + \ln |\cos \theta| + C}$$

3. (5 points) Calculer  $\int \frac{\sqrt{9x^2-1}}{x} dx$ .



Posons  $\sec \theta = \frac{3x}{1} \Rightarrow x = \frac{\sec \theta}{3}$

$\Rightarrow dx = \frac{\sec \theta \tan \theta}{3} d\theta$

$\Rightarrow \int = \int \frac{\sqrt{9\left(\frac{\sec \theta}{3}\right)^2 - 1}}{\frac{1}{3}\sec \theta} \cdot \frac{\sec \theta \tan \theta}{3} d\theta$

$= \int \frac{\sqrt{\tan^2 \theta}}{\sec \theta} \cdot \sec \theta \tan \theta d\theta$

$= \int \tan^2 \theta d\theta = \int (\sec^2 \theta - 1) d\theta$

$= \tan \theta - \theta + C$

$= \sqrt{9x^2-1} - \arcsin\left(\frac{3x}{\sqrt{9x^2-1}}\right) + C$

4. (5 points) Calculer  $\int \frac{x}{(x-1)^2} dx$

$\frac{x}{(x-1)^2} = \frac{A}{x-1} + \frac{B}{(x-1)^2}$

$\Rightarrow x = A(x-1) + B$

Si  $x=1 \Rightarrow \boxed{1 = B}$

Si  $x=0 \Rightarrow 0 = -A + B$

$\Rightarrow A = B \Rightarrow \boxed{A=1}$

$\int = \int \left[ \frac{1}{x-1} + \frac{1}{(x-1)^2} \right] dx$

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

$= \ln|x-1| - \frac{1}{x-1} + C$