Prepa Tec
Campus Cumbres

Calculus II
2nd partial Quiz #1A

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**I. Determine if the following propositions are True (T) or False(F) (5 points each):**

1. (T) Having $\int(\sin x+\cos x)dx$ is the same as having $\int(\sin x)dx+\int(\cos x)dx$
2. (F) The answer for $\int 6\frac{\csc(3x)}{\sin(3x)}dx$ is $-2\cot(3x)+C$
3. (F) $\int x(x^2+3)^2\,dx=\frac{1}{6}(x^2+3)^3+C$
4. (F) $\int(x^2-3)\tan(x^2-3x)dx=-\ln\left|\cos(x^2-3x)\right|+C$
5. (F) The integral of $\int(2\sin 3x+3x)dx$ is $-6\sin 3x+3+C$

**II. Solve the following exercises, show ALL your procedure and frame your final answer. (15 points each).**

If the equation of acceleration of an object is $a(t)=\frac{3}{t-4}$ and the velocity at t =5 is 8 m/s, then find the equation that determines the velocity of the object at any time *'t'*.

$a(t)=\frac{3}{t-4}=$

$du=1\,dt$

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$v(t)=3(t-4)^{-1}$

$v(t)=\frac{1}{3}\ln(t-4)+C$

$8=\frac{1}{3}\ln(5-4)+C\rightarrow C=8$

$v(t)=\frac{1}{3}\ln|t-4|+8$

**III. Find the antiderivative or integral of the following problems. SHOW YOUR ENTIRE PROCEDURE. (15 pts each)**

1- $h(x)=96Sin^2(2x+\pi)Cos(2x+\pi)$

$du=2\cos(2x+\pi)dx$

$H(x)=\int 96(\sin(2x+\pi))^2\cos(2x+\pi)\,dx$

$H(x)=\frac{96}{2}\int(\sin(2x+\pi))^2\,2\cos(2x+\pi)dx$

$H(x)=\frac{48}{16}\frac{u^3}{3}$

$H(x)=16\sin^3(2x+\pi)+C$

2- $v(t)=\frac{e^{5/t}}{3t^2}$ =

$x(t)=\frac{e^{5/t}}{3t^2}$ $du=\frac{-5}{t^2}dt$

$\frac{1}{3}(-\frac{1}{5})\int \frac{5e^{\frac{5}{t}}}{t^2}\,dt$

$x(t)=-\frac{e^{\frac{5}{t}}}{15}+C$

$x(t)=-e^{\frac{5}{t}}$

3- $\int 3x\,Cot\left(6x^2-1\right)Sin\left(6x^2-1\right)dx$

$\int 3x\left(\frac{1}{\tan(6x^2-1)}\right)\left(\sin(6x^2-1)\right)dx=$

$\int 3x\,\frac{\sin(6x^2-1)}{\tan(6x^2-1)}\,dx=$

$u=12x$

$\int 3x\cos(6x^2-1)\,dx=$

$\frac{1}{12}\int 12x\cos(6x^2-1)\,dx=$ $\rightarrow \frac{1}{4}\sin(6x^2-1)+C$

4- $\int 7\sec(3x)\tan(3x)\,dx$

$u=3x$

$\frac{7}{3}\int 3\sec(3x)\tan(3x)\,dx+$

$\frac{7}{3}\sec(3x)+C$

If the equation of acceleration of an object is $a(t) = \frac{3}{t-4}$ and the velocity at $t = 5.1$ s 8 m/s. Then find the equation that determines the velocity of the object at any time $t$.

$$a(t) = \frac{3}{t-4} =$$

$$\frac{dv}{dt} = 1$$

$$dv(t) = 3(t-4)^{-1} =$$

$$v(t) = 3\ln|t-4| + C = \quad 8 = 3\ln|5-4| + C \rightarrow C = 8$$

$$\boxed{v(t) = 3\ln|t-4| + 8}$$