Prepa Tec Campus Cumbres
Calculus II **3 partial Quiz # 1A**

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Choose T (true) or F (false) for each statement.

1. The partial fraction decomposition of the integral $\int \frac{4x^2+5x-45}{x^3-2x^2-15x}\,dx$ is $\frac{A}{x}+\frac{B}{(x+3)}+\frac{C}{(x-5)}$ F (V)

2. The integral of $\int \frac{5x^2+20x+6}{x^3+2x^2+x}\,dx$ is $6\ln|x|-ln|x+1|-9ln|x+1|+C$ (F) V

3. The integral of $\int (18-12x)(x^2-3x)^2dx$ is $-2(x^2-3x)^4+C$ (F) V

4. The integral of $\int 5x\sqrt{x-3}\,dx$ is $(x-3)^{\frac{5}{2}}+(x-3)^{\frac{3}{2}}+C$ (F) V

5. Solve the following integral, **THE STEPS OF YOUR PROCEDURE.**

$$\int \frac{x^3-3x^2+1}{x^2-1}\,dx$$

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

$du=1$ $du=1$

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

$A(x-1)+B(x+1) = x^3-3x^2+1$

$x=1$ $x=-1$

$\frac{3}{2}x = A$

$x = \frac{1}{2} - \frac{3}{2} = \frac{2}{3}$

$\frac{x^2}{2} - 3x + \frac{3}{2}\ln|x+1| - \frac{1}{2}\ln|x-1| + C$

$0+B(1+1) = (1)^3 - 3(1)^2 + 1$

$B(2) = 1-3+1$

$B(2) = -1$

$B = -1/2$

$A(-1-1)+0 = (-1)^3 - 3(-1)^2 + 1$

$A(-2) = -1-3+1$

$A(-2) = -3$

$A = 3/2$

CORRECTION:

$$\begin{array}{r|l} x-3 & \\ \hline x^2-1 & x^3-3x^2+0x+1 \\ & -x^3+0+x \\ \hline & -3x^2+x+1 \\ & +3x^2+0-3 \\ \hline & x-2 \end{array}$$

$(x-3)+\frac{x-2}{x^2-1}$

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

$A(x-1)+B(x+1)$

$x=1$ $x=-1$

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

$0+B(1+1) = 1-2$

$B(2) = -1$

$B = -1/2$

$A(-1-1) = -1-2$

$A(-2) = -3$

$A = 3/2$

$= \frac{x^2}{2} - 3x + \frac{3}{2}\ln|x+1| - \frac{1}{2}\ln|x-1| + C$

① $x^3 - 2x^2 - 15x$

$x(x^2 - 2x - 15)$

$x(x-5)(x+3)$

② $\frac{5x^2 + 20x + 6}{x^3 + 2x^2 + x} = \frac{5x^2 + 20x + 6}{x(x+1)(x+1)}$

$x(x^2 + 2x + 1)$

$x(x+1)(x+1)$

$\frac{A}{x} + \frac{B}{(x+1)} + \frac{C}{(x+1)}$

$A(x+1)(x+1) + B(x)(x+1) + C(x)(x+1)$

$x = -1 \qquad x = 0$

$Ax^2 + A2x + A2 + Bx^2 + Bx + Cx^2 + Cx$

$x^2(A+B+C) + x(2A+B+C) + 2A$

$A+B+C = 5$

$2A+B+C = 20$

$2A = 6 \qquad A = 3$

③ $\int (18 - 12x)(x^2 - 3x)^2\,dx \qquad \int \frac{6(x^2-3x)^3}{3} = -2(x^2-3x)^3 + C$

$u = x^2 - 3x$

$du = 2x - 3$

④ $\int 5x\sqrt{x-3}\,dx = \int 5(u+3)u^{1/2}\,du = \int (5u + 15)u^{1/2}\,du = \int 5u^{3/2} + 15u^{1/2}\,du = \frac{5u^{5/2}}{5/2} + \frac{15u^{3/2}}{3/2} = 2u^{5/2} + 10u^{3/2}$

$u = x - 3 \qquad x = u + 3 \qquad \frac{5}{1} \div \frac{5}{2} = \frac{10}{5} = 2 \qquad \frac{15}{1} \div \frac{3}{2} = \frac{30}{3} = 10$

$du = 1 \qquad dx = du$

$= 2(x-3)^{5/2} + 10(x-3)^{3/2} + C$