

PRINT Your Name: _____

Get your course grade from TIPS/VIP late on Tuesday or later.

There are 20 problems on 8 pages. Problems 1 to 10 are worth 8 points each.

Each of the other problems is worth 7 points. SHOW your work. **CIRCLE** your answer. Check your answer whenever possible. No Calculators.

1. Find $\int \sin^3 x \cos^2 x dx = \int \sin x (1 - \cos^2 x) \cos^2 x dx = \int (1 - u^2) u^2 du = -\int u^2 - u^4 du$

$u = \cos x$
 $du = -\sin x dx$

8
 $= -\frac{u^3}{3} + \frac{u^5}{5} + C = \frac{-\cos^3 x}{3} + \frac{\cos^5 x}{5} + C$

$\checkmark: \frac{d}{dx} (\text{Answer}) = \cos^2 x \sin x - \cos^4 x \sin x = \sin x \cos^2 x (1 - \cos^2 x) \checkmark$

2. Find $\int \cot x dx = \int \frac{\cos x}{\sin x} dx = \int \frac{du}{u} = \ln |\sin x| + C$

$u = \sin x$
 $du = \cos x dx$

$\checkmark \frac{d}{dx} (\text{PA}) = \frac{\cos x}{\sin x} \checkmark$

8

3. Find $\int x e^{3x} dx = \frac{1}{3} x e^{3x} - \frac{1}{3} \int e^{3x} dx = \frac{1}{3} x e^{3x} - \frac{1}{9} e^{3x} + C$

$u = x \quad v = \frac{1}{3} e^{3x}$
 $du = dx \quad dv = e^{3x} dx$

8

$\checkmark \frac{d}{dx} (\text{PA}) = x e^{3x} + \frac{1}{3} e^{3x} - \frac{1}{3} e^{3x} \checkmark$