

Evaluate $\int \sec^6 x \tan^4 x \, dx$. $= \int \sec^4 x \tan^4 x \sec^2 x \, dx$

$u = \tan x$ ①
 $du = \sec^2 x \, dx$

$= \int (u^2 + 1)^2 u^4 \, du$ ①

$= \int (u^8 + 2u^6 + u^4) \, du$ ①

$= \frac{1}{9} u^9 + \frac{2}{7} u^7 + \frac{1}{5} u^5 + C$ ①

$= \frac{1}{9} \tan^9 x + \frac{2}{7} \tan^7 x + \frac{1}{5} \tan^5 x + C$ ①

SCORE: ____ / 5 PTS

① IF YOU FORGOT
+C AT THE
END

Evaluate $\int (5x^2 - x + 3) \sin 2x \, dx$. = $\left(-\frac{5}{2}x^2 + \frac{1}{2}x - \frac{3}{2}\right) \cos 2x$ $\textcircled{2}$ SCORE: _____ / 5 PTS

$$\begin{array}{r}
 \underline{u} \\
 5x^2 - x + 3 \\
 10x - 1 \\
 10 \\
 0
 \end{array}
 \begin{array}{l}
 \underline{dv} \\
 \sin 2x \\
 + \\
 -\frac{1}{2} \cos 2x \\
 + \\
 -\frac{1}{4} \sin 2x \\
 + \\
 \frac{1}{8} \cos 2x
 \end{array}$$

$$\textcircled{\frac{1}{2}} + \left(\frac{5}{2}x - \frac{1}{4}\right) \sin 2x + \frac{5}{4} \cos 2x \textcircled{1} + C$$

$$= \left(-\frac{5}{2}x^2 + \frac{1}{2}x - \frac{1}{4}\right) \cos 2x + \left(\frac{5}{2}x - \frac{1}{4}\right) \sin 2x + C \textcircled{\frac{1}{2}}$$

$\textcircled{-\frac{1}{2}}$ IF YOU FORGOT +C

Evaluate $\int e^{-2x} \cos 5x \, dx = \underline{-\frac{1}{2} e^{-2x} \cos 5x + \frac{5}{4} e^{-2x} \sin 5x}$ (2)

SCORE: ___ / 5 PTS

<u>u</u>	<u>dv</u>
$\cos 5x$	$+ e^{-2x}$
$-5 \sin 5x$	$- \frac{1}{2} e^{-2x}$
$-25 \cos 5x$	$+ \frac{1}{4} e^{-2x}$

$\underline{-\frac{25}{4} \int e^{-2x} \cos 5x \, dx}$ (1)

$\underline{\frac{29}{4} \int e^{-2x} \cos 5x \, dx = -\frac{1}{2} e^{-2x} \cos 5x + \frac{5}{4} e^{-2x} \sin 5x}$ (1)

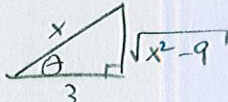
$\underline{\int e^{-2x} \cos 5x \, dx = -\frac{2}{29} e^{-2x} \cos 5x + \frac{5}{29} e^{-2x} \sin 5x + C}$ (1)

(1) IF YOU FORGOT +C

Evaluate $\int (x^2 - 9)^{\frac{3}{2}} dx$.

SCORE: ____ / 9 PTS

$x = 3 \sec \theta$ \longrightarrow $\sec \theta = \frac{x}{3}$



$dx = 3 \sec \theta \tan \theta d\theta$

$\int (9 \sec^2 \theta - 9)^{\frac{3}{2}} \cdot 3 \sec \theta \tan \theta d\theta$

$= \int (9 \tan^2 \theta)^{\frac{3}{2}} \cdot 3 \sec \theta \tan \theta d\theta$

$81 \int \sec \theta \tan^4 \theta d\theta$

$= 81 \int \sec \theta (\sec^2 \theta - 1)^2 d\theta$

$81 \left[\int \sec^5 \theta d\theta - 2 \int \sec^3 \theta d\theta + \int \sec \theta d\theta \right]$

$= 81 \left[\frac{1}{4} \sec^3 \theta \tan \theta + \frac{3}{4} \int \sec^3 \theta d\theta - 2 \int \sec^3 \theta d\theta + \int \sec \theta d\theta \right]$

$= 81 \left[\frac{1}{4} \sec^3 \theta \tan \theta - \frac{5}{4} \left(\frac{1}{2} (\sec \theta \tan \theta + \ln |\sec \theta + \tan \theta|) \right) + \ln |\sec \theta + \tan \theta| \right] + C$

$= 81 \left[\frac{1}{4} \sec^3 \theta \tan \theta - \frac{5}{8} \sec \theta \tan \theta + \frac{3}{8} \ln |\sec \theta + \tan \theta| \right] + C$

$81 \left[\frac{1}{4} \left(\frac{x}{3} \right)^3 \frac{\sqrt{x^2 - 9}}{3} - \frac{5}{8} \frac{x}{3} \frac{\sqrt{x^2 - 9}}{3} + \frac{3}{8} \ln \left| \frac{x}{3} + \frac{\sqrt{x^2 - 9}}{3} \right| \right] + C$

$= \frac{1}{4} x^3 \sqrt{x^2 - 9} - \frac{45}{8} x \sqrt{x^2 - 9} + \frac{243}{8} \ln |x + \sqrt{x^2 - 9}| + C$

IF YOU FORGOT +C AT THE END

