

Each problem is worth 5 points. For full credit provide proper justification for your answer.

1. Find the indefinite integral  $\int \left( \frac{y^2-1}{y} \right)^2 dy$ .

$$\begin{aligned}
 &= \int \frac{(y^2-1)^2}{y^2} dy \\
 &= \int \frac{y^4 - 2y^2 + 1}{y^2} dy \\
 &= \int \left( \frac{y^4}{y^2} - \frac{2y^2}{y^2} + \frac{1}{y^2} \right) dy \quad \text{Great} \\
 &= \int y^2 dy - 2 \int dy + \int y^{-2} dy \\
 &= \frac{y^3}{3} - 2y + \frac{y^{-1}}{-1} + C \\
 &= \frac{1}{3}y^3 - 2y - \frac{1}{y} + C_n \quad \text{Ans}
 \end{aligned}$$

2. Find the indefinite integral  $\int \sin^3 \alpha \cos \alpha d\alpha$ .

let  $u = \sin \alpha$

$$\frac{du}{d\alpha} = \cos \alpha \quad d\alpha = \frac{du}{\cos \alpha}$$

$$= \int u^3 \cos \alpha \cdot \frac{du}{\cos \alpha}$$

$$= \int u^3 du$$

$$= \frac{u^4}{4} + C$$

Well done

$$= \frac{1}{4} \sin^4 \alpha + C$$