

Integration Strategies

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1. Simplify the integrand if possible

$$\begin{aligned} & \int (\sin x + \cos x)^2 dx \\ &= \int (\sin^2 x + 2\sin x \cos x + \cos^2 x) dx \\ &= \int 1 + \sin 2x dx \end{aligned}$$

2. Look for obvious substitution

$$\begin{aligned} & \int x^3 e^{x^4} dx \\ & \quad u = x^4 \\ & \quad \frac{1}{4} \int e^u du \end{aligned}$$

3. Classify the integrand according to its form and use a corresponding method

- (a) $\int \sin^m x \cos^n x dx$
- (b) $\int \tan^m x \sec^n x dx$
- (c) $\int \frac{P(x)}{Q(x)} dx$

4. Integration by parts
5. Use trig substitution for radicals
6. Try another method