

How to solve an integral

How do I know which technique to use to solve a given integral?

Use this flow chart to get you started.

1) Is it something I have memorized?

Yes: try the **inverse trigonometric function formulas**

No: Go to #2

2) Can I do some algebraic manipulations?

Yes: try to split up the numerator, distribute, complete the square in the denominator, polynomial division

No: Go to #3

3) Can I use **u-substitution**?

Yes: Assign a term to be equal to u, then calculate du; determine if du makes up the remaining portion of the integral (excluding constants)

No: Go to #4

4) Classify the integral into one of these types:

a) Polynomial/Polynomial → **Partial Fractions**

b) Trig functions raised to powers and/or multiplied together → **Powers/Products of trig functions**

c) Product of two functions, sometimes with e and/or a trig function → **Integration by Parts**

d) Denominator is in the form:

$a^2 \pm x^2$ or $x^2 \pm a^2$ → **Trigonometric Substitution**