

Integrals Galore!

Here are some sample integrals that you should be able to evaluate, using integration by substitution, integration by parts or simplification then antidifferentiation:

$$\int_1^2 x \ln(x^2) dx =$$

$$\int \frac{x^3 + x}{\sqrt{x}} dx =$$

$$\int_1^2 x^3 \ln(x) dx =$$

$$\int \sqrt{x+1} x^2 dx$$

An Algorithm For Computing Antiderivatives and Integrals

1. Is it an antiderivative or an integral (i.e. is the answer a family of functions or a number?)
2. Try to simplify the integrand.
3. Consult your table of antiderivatives.
4. Does the integrand consist of a product of functions?
5. Do you see a composite function in the integrand? Do you also see the derivative of the “inside function” multiplying the “ dx ”?
6. If using integration by substitution, make sure you can convert the ENTIRE integral into the new variable.
7. If using integration by parts, you should choose carefully which function you want to differentiate and which function you want to anti-differentiate.
8. If it is a definite integral, you can use numerical methods (Riemann sums) to approximate the answer.
9. If it is an antiderivative, you can also consult a table of integrals or a computer program like Derive.
10. **CHECK YOUR ANTIDERIVATIVE, BY DIFFERENTIATING IT TO PRODUCE THE INTEGRAND!**