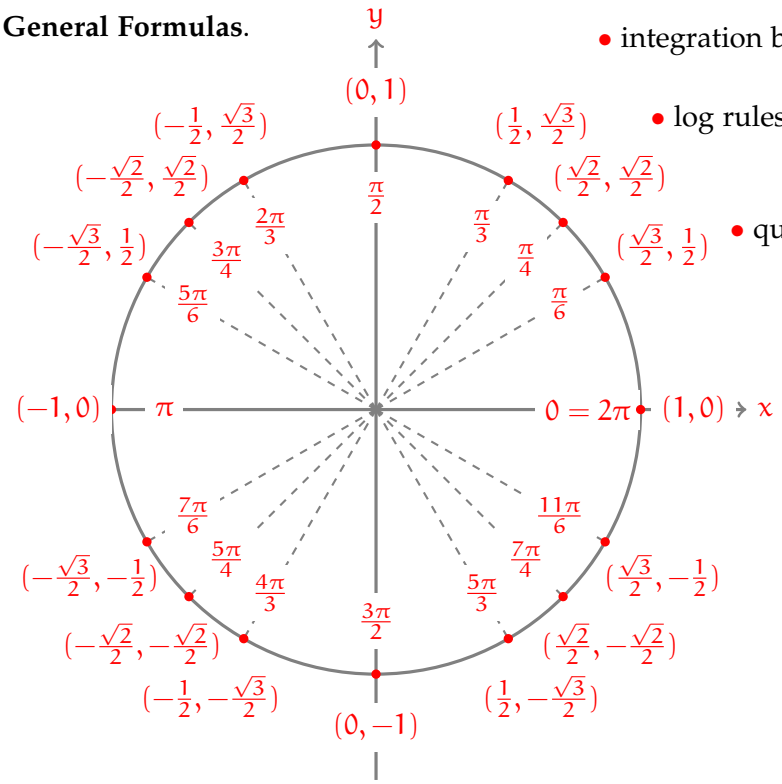
General Formulas.



- integration by parts: $\int u\,dv = uv - \int v\,du$
- log rules: $\ln(A) + \ln(B) = \ln(AB)$, $\ln(A) - \ln(B) = \ln\left(\frac{A}{B}\right)$, $c\ln(A) = \ln(A^c)$
- quadratic formula: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

A2 Formulas.

- for $y' + a(x)y = f(x)$ we have:
  - integrating factor $I(x) = e^{\int a(x)\,dx}$
  - variation of parameters: $y = uy_h$ where $y_h = e^{-\int a(x)\,dx}$ and $u = \int \frac{f(x)}{y_h}\,dx$
- circuits
  - Kirkhoff's Voltage Law: $E = RI + LI' + Q/C$
  - derivative of charge is current: $I = Q'$
- Bernoulli equation: $y' + a(t)y = f(t)y^n$
  - substitute $u = y^{1-n}$ to convert to $u' + (1-n)a(t)u = (1-n)f(t)$