Integration Methods	
1. Memorized	See Larson's 1-pager of common integrals

Integration Methods	
2. U-Substitution	$$\int f(g(x))g'(x)dx = F(g(x)) + C$$ Set $u = g(x)$, then $du = g'(x)\,dx$ $$\int f(u)\,du = F(u) + C$$ $u = \underline{\quad}$ $\qquad du = \underline{\quad} dx$

Integration Methods	
3. Integration by Parts	$$\int u\,dv = uv - \int v\,du$$ $u = \underline{\quad}$ $\qquad v = \underline{\quad}$ $du = \underline{\quad}$ $\qquad dv = \underline{\quad}$ Pick 'u' using the **LIATED** Rule: **L – Logarithmic :** $\ln x, \log_b x$ **I – Inverse Trig.:** $\tan^{-1} x, \sec^{-1} x, etc.$ **A – Algebraic:** $x^2, 3x^{60}, etc.$ **T – Trigonometric:** $\sin x, \tan x, etc.$ **E – Exponential:** $e^x, 19^x$ **D – Derivative of:** dy/dx

Integration Methods	
4. Partial Fractions	$$\int \frac{P(x)}{Q(x)}\,dx$$ where $P(x)$ and $Q(x)$ are polynomials **Case 1:** If degree of $P(x) \geq Q(x)$ then do long division first **Case 2:** If degree of $P(x) < Q(x)$ then do partial fraction expansion

Integration Methods	
5a. Trig Substitution for $\sqrt{a^2 - x^2}$	$$\int \sqrt{a^2 - x^2} \, dx$$ Substitution: $x = a \sin \theta$ Identity: $1 - sin^2 \theta = cos^2 \theta$
5b. Trig Substitution for $\sqrt{x^2 - a^2}$	$$\int \sqrt{x^2 - a^2} \, dx$$ Substitution: $x = a \sec \theta$ Identity: $sec^2 \theta - 1 = tan^2 \theta$
5c. Trig Substitution for $\sqrt{x^2 + a^2}$	$$\int \sqrt{x^2 + a^2} \, dx$$ Substitution: $x = a \tan \theta$ Identity: $tan^2 \theta + 1 = sec^2 \theta$

Integration Methods	
6. Table of Integrals	CRC Standard Mathematical Tables book

Integration Methods	
7. Computer Algebra Systems (CAS)	TI-Nspire CX CAS Graphing Calculator TI –Nspire CAS iPad app

Integration Methods	
8. Numerical Methods	Riemann Sum, Midpoint Rule, Trapezoidal Rule, Simpson's Rule, TI-84, etc.