If this doesn't work, try:

Basic Known Integrals

Derivatives of inverse trigonometric functions, ie

$$\int \frac{dx}{\sqrt{(1-x^2)}}=\arcsin(X)$$

$$\int \frac{dx}{(1+x^2)}=\arctan(X)$$

Or just basic trig functions, ie

$$\int csc^2(x)dx=-\cot(x)+c$$

$$\int sec^2(x)dx=\tan(x)+c$$

$$\int csc(x)\cot(x)dx=-csc(x)+c$$

$$\int sec(x)\tan(x)dx=sec(x)+c$$

And of course these,

$$\int \sin(x)dx=\cos(x)+c$$

$$\int \cos(x)dx=-\sin(x)+c$$

$$\int \tan(x)dx=\ln|sec(x)|+c$$

$$\int csc(x)dx=\ln|csc(x)-\cot(x)|+c$$

$$\int sec(x)dx=\ln|sec(x)+\tan(x)|+c$$

$$\int \cot(x)dx=\ln|\sin(x)|+c$$

1 Substitution

There is not a whole to to say here other than:
After you are sure there are ▲ no basic known integrals ▲ ;
Try SUBSTITUTION and make sure IT DOESN'T WORK before you go and
bust your &#$!!! on the following techniques!!!

2 Integration by Parts

(uv - ∫vdu)

Use Integration by parts when your integral is:
1. a product of two things (logarithmic, inverse trigonometric, algebraic, trigonometric, exponential,
2. only one thing in cases of logarithmic or inverse trig

Pick your *U* and *DV* based on:
1. if you can't integrate one, make it your U
2. pick whatever gets simpler
3. if after using integration by parts, you're back to where you started, move it to the left

From Stewart's "Calculus" Solution's, the mnemonic device LIATE, a principle of precedence for choosnig U:
Logarithmic, Inverse trig, Algebraic, Trigonometric, Exponential

3 Trigonometric Substitution

If you see something like this, consider substituting "w" with trig.

$$\sqrt{(w^2-a^2)};\frac{w}{a}=sec\,\theta$$

$$\sqrt{(a^2-w^2)};\frac{w}{a}=\sin\theta$$

$$\sqrt{(a^2+w^2)};\frac{w}{a}=\tan\theta$$

If radical is missing $(4+x^2)^3$ make your own $(\sqrt{4+x^2})^6$

If quadratic $\sqrt{x^2+4x-7}$ complete the square $\sqrt{(x+2)^2-9}$

If radical is missing and it's quadratic, do both

4 Trigonometric Integration (products of trig functions)

Integrals in the form of $\int \sin^m\theta\cos^n\theta\,dx$ If either m or n is odd; use the other as U. If both m and n are even, know the half angle or power reducing identity and use it. If both are odd, flip a coin.

$$\int \sin^3\theta\cos^2\theta\,d\theta=\int \sin^2\theta\cos^2\theta\sin\theta\,d\theta=\int (1-\cos^2\theta)\cos^2\theta\sin\theta\,d\theta\ THEN\,[w=\cos\theta]$$

Integrals in the form of $\int \tan^m\theta\,sec^n\theta\,dx$ If "n" is even, use $\tan\theta$ as your U; If "n" is odd, integrate by parts; If "m" is odd, use $sec\,\theta$; if "m" is even, convert to $sec\,\theta$

5 Partial Fractions

If the numerator is the same degree or higher than the denominator, perform long division. Then integrate the resulting expression. Otherwise, consider the following steps

Factor the denominator, where each factor is:
i) linear (ax+b) ,
ii) an irreducible quadratic (ax^2+bx+c) or
iii) a power of the form $(ax+b)^n$ or $(ax^2+bx+c)^n$

Perform partial fraction decomposistion where each fraction is in the form of either:
- $F(x) = A/(ax+b)^k$ or
- $F(x) = Ax+B/(ax^2+bx+c)^k$

Solve for numerators using a system of equations or collecting like terms of x.