First, look for obvious simplifications.
Second, look for obvious substitutions.
Third, start looking for one of our four other methods:

For Products, log's, inverse trig

INTEGRATION BY PARTS

u = dv =

du = v =

If you're stuck on choosing *u* remember LIPET. (But after you get comfortable with this method, you shouldn't need LIPET anymore)

For sin's, cos's, tan's, sec's

TRIG. INTEGRALS

1. Odd cos → u = sin(x)
2. Odd sin → u = cos(x)
3. Even sec → u = tan(x)
4. Odd tan → u = sec(x)
5. Even sin & cos → Half Angle Identities

In the first 4 cases you need the identities:

$\sin^2(x) = 1 - \cos^2(x)$

$\cos^2(x) = 1 - \sin^2(x)$

$\tan^2(x) = \sec^2(x) - 1$

$\sec^2(x) = \tan^2(x) + 1$

For the 5^{th} case, you need the half angle identities:

$\sin^2(x) = (1 - \cos(2x))/2$

$\cos^2(x) = (1 + \cos(2x))/2$

$\sin(x)\cos(x) = \sin(2x)/2$

For radicals with $a^2 - x^2$, $x^2 + a^2$, $x^2 - a^2$ or if quadratic doesn't factor

TRIG. SUBSTITUTION

If the quadratic has a linear term (`middle term') and it doesn't factor, then you need to complete the square. (1/2 of middle term, square, add and subtract value) The rest of the method follows by making the correct substitution.

$x = a \sin(\theta)$ (for $a^2 - x^2$)

$x = a \tan(\theta)$ (for $x^2 + a^2$)

$x = a \sec(\theta)$ (for $x^2 - a^2$)

At the end, draw and label the TRIANGLE to get back to x's

For rational functions

PARTIAL FRACTIONS

Divide if the power of top is bigger than power on bottom.

Then factor the bottom and set up and solve the partial fraction decomposition.

Distinct Linear Factors

→ Determine a constant for each factor.

Non-Distinct Linear Factors

→ Determine a constant for each factor, along with each power from 1 up to the number of times repeated.

Irreducible Quadratic Factor

→ Complete the square, the numerator of the factor is Ax+B.