**Improper Integrals**

An integral is improper if either the interval is not finite or the function to integrate is not continuous within the interval.

**Improper Integrals**

* The integrand = the expression to be integrated
* The integral = the expression after it has been integrated

**Type 1 – the integral included** $\pm \infty $ **as one of its limits**

1. Substitute $\infty =n$.
2. Integrate as normal.
3. Evaluate the integral using the limit $n$ and the other limit.
4. Determine if, as $n\rightarrow \infty $, the integral approaches a finite value.
5. If yes then the improper integral can be found and the answer is this finite value.
6. If no then the improper integral cannot be found and does not have a finite value (or area).

**Type 2 – the integral is undefined at somewhere between the limits (including at limits)**

1. Determine where the integral is undefined. If undefined between the limits then split the single integral into two integrals at this point.
2. Substitute the $x$ value where the integral is undefined for $p$.
3. Integrate as normal.
4. Evaluate the integral(s) using the limit $p$ and the other limit.
5. Determine is, as $p\rightarrow the limit which was replaced$, the integral approaches a finite value.
6. If yes then the improper integral can be found and the answer is this finite value. If the integral was split into two, remember to add both parts together to obtain the final answer.
7. If no then the improper integral cannot be found and does not have a finite value (or area).