EXERCISE SHEET : MORE AREAS

1. Compute the antiderivatives of the following functions :

i) $f(x) = \frac{1}{x\sqrt{1-\ln^2(x)}}$

ii) $f(x) = \frac{1}{x(1+\ln^2(x))}$

iii) $f(x) = \frac{\ln(x)}{x}$

iv) $f(x) = \frac{\ln(\sin(x))}{\tan(x)}$

v) $f(x) = xe^{-x^2}$

vi) $f(x) = \frac{1+2x+x^2}{3x+3x^2+x^3}$

2. Consider the function $f(t) = te^{-t^2}$.

i) Find the area $A(x)$ under the graph of $f(t)$ between $t = 0$ and $t = x$.

ii) Compute the limit of $A(x)$ ad $x \to +\infty$.

3. Compute the area of the region between the graphs of the functions $f(x) = x^2 - 3$ and $g(x) = 1$.

4. Compute the area of the region between the curves $x = \sin(y)$ and $x = \cos(2y)$ for $y \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$