Name and Surname	
Student Id	
Signature	

Question	1	2	3	4	Total
Score					

Questions		Learning Objectives				
		L1	L2	L3	L4	L5
	Q1	✓	✓			
	Q2				✓	
	Q3			✓		✓
	Q4				✓	

Questions

Q1 (25 Points) A floating point number in IEEE 754 Single Precision is given as

$$42018F5C$$

in hexadecimal notation. Convert this number to decimal.

Q2 (25 Points) Use the central difference approximation to find the numerical derivative of

$$f(x) = \tan x$$

with $h = 0.1$ at $x = \pi/4 = 90^o$. Find the error by comparing your result with the analytical derivative

$$\frac{d}{dx}f(x) = \frac{1}{\cos^2 x}$$

Q3 (25 Points) Determine the root (the zero) of
$$f(x) = \tan x$$
using Newton-Raphson Method. Use the initial guess as $x_0 = \pi/4 = 90^o$. Iterate until the error falls below the tolerance 10^{-4}.

Q4 (25 Points) Use trapezoidal rule to approximate the integral of $f(x) = \exp(-x^2)$ from $a = 0$ to $b = 2$ with $n = 5$ intervals.