Numerical Methods Quiz

1) Use the Secant Method to approximate:
$f(x) = \sin(e^x) + 2\cos x + 2 / x^2$
given: $x_{-1} = 1$, $x_0 = 0$, and $\varepsilon_s = 1.5\ \%$

Iteration	x_{i+1}	ε_a
1	2.1917	...
2	...	...
...	...	...

2) Use the Newton-Raphson Method to approximate:
$f(x) = 3e^{(2 - x^2)} - 2e^{x/5} + \sin x / e^x$
given: $x_0 = 3$, $\varepsilon_s = 0.2\ \%$

$f'(x) = -6\,xe^{(2 - x^2)} - 2/5\,e^{x/5} + (\cos x - \sin x) / e^x$

Iteration	x_{i+1}	ε_a
1	-1.52342	295.54 %
2	...	...
3	...	...
4	-1.2359	0.17 %

3) Use the Bisection Method to approximate:
$f(x) = 3x^4 - 2x^2 + 3x - 4$
given: True Value = 1, $x_L = 0.25$, $x_U = 1.5$, $\varepsilon_s = 5\ \%$

Iteration	sign	x_L	x_U	x_r	ε_t	ε_a
1	+	0.25	1.5	0.875	12.5%	none
2	-	...	...	...	...	...
3	-	...	...	...	...	...
4	+	...	...	...	...	...
5		...	...	...	...	3.94%