1. Find the point at which the function

$$f(x) = \frac{1 - \tan(x)}{\sec(x)} \tag{1}$$

has a horizontal tangent line.

2) Evaluate the second derivative of the function

$$f(x) = x \sin(x) + e^x \tag{2}$$

3) Find the constant "a" such that the function

$$\left\{ \begin{array}{ll} ax^2 + 3x & \text{if } x \leq 1 \\ 5x - 1 & \text{if } x > 1 \end{array} \right\} \tag{3}$$

becomes continuous at x=1. Is this function differentiable at $x = 1$?
Hint: Notice that the necessary condition for a function to be differentiable is to be continuous at first step. Then, you should find left and right derivative of $f(x)$ at $x = 1$ separately to see if they match each other and as a consequence this function becomes differentiable.