Antiderivatives and Area Under Curve Quiz

1. Find a function f such that $f'(x) = x^2 - 2x + 4$ and the line $x - \frac{1}{3}y + \frac{5}{3} = 0$ is tangent to the graph of f.

2. Using geometry find the area under the curve for the following piecewise function: (Make sure to sketch a picture of what the graph might look like to help)

$$f(x) = \begin{cases} -1 - \sqrt{1 - x^2} & 0 \leq x < 1 \\ x - 2 & 1 \leq x < 3 \\ 1 - \sqrt{1 - (x-4)^2} & 3 \leq x \leq 4. \end{cases}$$