Mathematics 1510 Tutorial #3

1. Let $f(x)=\dfrac{1}{x^2+1}$. Using only the definition of the derivative find $f'(x)$.

2. Use the definition of a derivative to find $f'(x)$ if $f(x)=x\sqrt{x+5}$ with $x \geq 5$.

3. Fill in the blanks if f is an odd function with the following properties.

   $f(2)=5$ $\qquad$ $f(5)=-2$

   The line with equation $y=-2$ is a horizontal asymptote.

   The line with equation $x=3$ is a vertical asymptote.

   (a) The value of $f(-2)=$ _____.

   (b) The line with equation _____ must be a vertical asymptote.

   (c) The line with equation _____ must be a horizontal asymptote.

4. The x-axis, the y-axis, and the normal line to the curve $y=x^2+x$ at the point $(1, 2)$ form a triangle. Find the area of this triangle.

5. At what point(s) on the parabola with equation $y=x^2$ does the tangent line pass through the point with coordinates $(2,-5)$?

   [Note: The point $(2,-5)$ does not lie on the given parabola.]