Tangent and Secant Line Approximations

Directions: Do what it says.

1. Use a tangent line at $x = 2$ to approximate the value of $f(2.1)$ given $f(x) = \frac{x^2}{x-1}$. Use the second derivative to determine if your approximation is an underestimate or an overestimate.

2. Use the secant line on the interval $[1,3]$ to approximate the value of $f(2)$ given $f(x) = x^4 - 3x^2 + 1$. Use the second derivative to determine if your approximation is an underestimate or an overestimate.

3. Use a tangent line at $x = -3$ to approximate the value of $f(-2.9)$ given $f(x) = x^2 - 3x + 1$. Use the second derivative test to determine if your approximation is an underestimate or an overestimate.

4. Use a secant line on the interval $[0,4]$ to approximate the value of $f(1.5)$ given $f(x) = \frac{x+1}{x+2}$. Use the second derivative test to determine if your approximation is an underestimate or an overestimate.

5. Use a tangent line at $x = 1$ to approximate the value of $f(0.9)$ given $f(x) = 2x - \ln x$. Use the second derivative test to determine if your approximation is an underestimate or an overestimate.

6. Use a secant line on the interval $[-1,1]$ to approximate the value of $f(0.2)$ given $f(x) = x^3 + \sin^{-1} x$. Use the second derivative test to determine if your approximation nis an underestimate or an overestimate.