Different Quotient and Limits

Name: _____

1. Use the difference quotient, $\frac{f(x+x)-f(x)}{h}$, to find the average velocity for f(x). Be sure to simplify your answers.

   (a) $f(x) = 5x^2$

   (b) $f(x) = x^2 + x$

   (c) $\frac{1}{x}$

2. Using your solutions from Problem 1, determine what the instantaneous velocity given the following.

   (a) $f(x) = 5x^2$ at x=10.

   (b) $f(x) = x^2 + x$ at x=-1.

   (c) $\frac{1}{x}$ at x=2.

3. Now, find the equation of the tangent line for Problem 2(a)-2(c) at the given x values.

(a) _____

(b) _____

(c) _____

4. Use algebra to evaluate the limits.

(a) $\lim_{h \to 0} \frac{(2+h)^2 - 4}{h}$

(b) $\lim_{h \to 0} \frac{(3+h)^2 - (3-h)^2}{2h}$