AP Calculus AB

# Limit Def. of Derivative; Avg vs Inst Rates of Change; Tangent Lines

**Use the definition of the derivative to find the derivative of each function with respect to *x*.**

1) $y = -2x^2 + 5$

2) $y = 2x^2 + 3$

**For each problem, find the average rate of change of the function over the given interval and also find the instantaneous rate of change at the leftmost value of the given interval.**

3) $f(x) = x^2 - 1; \quad [2, \frac{5}{2}]$

4) $f(t) = -2t^2 + 1; \quad [-1, -\frac{1}{2}]$

5) $h(s) = s^2 - 1;\ \ [1, \frac{3}{2}]$

6) $f(x) = x^2 + 2x - 2;\ \ [0, \frac{1}{2}]$

**For each problem, find the equation of the tangent line to the function at the given point. Give your answers in slope-intercept form.**

7) $y = 2x^2 - 2;\ (-2, 6)$

8) $y = -2x^2 + x + 2;\ (1, 1)$

9) $y = x^2 - 1;\ (-1, 0)$

10) $y = x^2 + x - 1;\ (-3, 5)$