

Use the limit definition of derivative to find the slope of the tangent line at any point.

1) $f(x) = 5x + 1$

2) $f(x) = -3x^2 + x + 5$

3) $f(x) = x^3 + 2x$

4) $f(x) = \sqrt{x}$

5) $f(x) = x^2 + 2x + 1$

6) $f(x) = -\frac{3}{2}x^2$

7) Find the slope of the tangent line for $f(x) = x^4 - 2x + 3$ at $x = 2$.

8) A ball is dropped from the top of a building with a position function of $s(t) = -16t^2 + 32t + 50$. Find the instantaneous rate of change at $t = 2$.

a) From 2010 to 2017, the student population of Heritage High School was modeled by $P(t) = 5t^2 - t + 1682$. Find the average rate of change of the population over the years.