

Name: _____
Group Members Present: _____

Grade: _____

_____, _____, & _____

1. $P(x) = -0.015x^3 + 0.88214x^2 - 12.857x + 427.6212$ thousand people gives the projected population of 18- to 24-year-olds in South Carolina between 1990 and 2025.

- a. Numerically estimate the rate of change of the 18- to 24-year-old population in 1995 to two decimal places.

x	$\frac{P(x) - P(5)}{x - 5}$	x	$\frac{P(x) - P(5)}{x - 5}$
4.9		5.1	
4.99		5.01	
4.999		5.001	
4.9999		5.0001	
4.99999		5.00001	
$\lim_{x \rightarrow 5^-} \frac{P(x) - P(5)}{x - 5} \approx$		$\lim_{x \rightarrow 5^+} \frac{P(x) - P(5)}{x - 5} \approx$	

$P'(5) \approx$ _____

- b. Interpret the result in part a.
- c. Calculate $P(5)$.
- d. Calculate the percentage rate of change at $x = 5$.
- e. Interpret the result in part d.

2. The table lists the number of bald eagle pairs in the United States.

- a. Find a cubic model for the data with input aligned to years since 1980 and output represented by $E(x)$.

Year	Eagle pairs
1988	1900
1989	2500
1990	3000
1991	3400
1992	3700
1993	4000
1994	4500

- b. Numerically estimate (to the nearest whole number) how rapidly the number of bald eagle pairs was growing in 1990.

x	$\frac{E(x) - E(10)}{x - 10}$	x	$\frac{E(x) - E(10)}{x - 10}$
9.9			
9.99			
$\lim_{x \rightarrow 10^-} \frac{E(x) - E(10)}{x - 10} \approx$		$\lim_{x \rightarrow 10^+} \frac{E(x) - E(10)}{x - 10} \approx$	

$$\left. \frac{dE}{dx} \right|_{x=10} \approx$$

- c. Calculate and interpret the percentage rate of change of E at $x = 10$.