

## Comparing Rates of Growth.

1. Search and Rescue teams are often called upon to find lost hikers in remote areas in the Southwest. Members of the search team walk parallel to one another at a fixed distance  $d$  between searchers through the area being searched. Experience has shown that the team's chance of finding a lost individual is related to the distance,  $d$ , of separation. The closer together the searchers are, the better the chances of success. Based on a number of simulated missions, the percentage of lost people was used to assess the probability of finding someone based on various separation distances as shown in the table below.

Distance ( $d$ ) feet	20	40	60	80	100
Probability ( $P$ ) %	90	80	70	60	50

- a. Write a function that describes this relationship.
  - b. When is the probability 100%? When is it 0%? What points do these correspond to on the graph?
2. Each year, the world's annual consumption of water rises. Also, this annual increase rises each year. Sketch a graph of the annual world consumption of water as a function of time.
3. Sales of microwave ovens grew slowly when they were first introduced and then increased dramatically as more people appreciated their value. Eventually, sales began to slow as the marketplace neared saturation. Sketch the graph of microwave oven sales as a function of time.

4. The snow tree cricket, which lives in the Rocky Mountains, has been studied by field biologists who have gathered the following measurements on how the chirp rate depends on air temperature.

Temperature (F)	50	55	60	65	70	75	80
Rate (chirps/min)	40	60	80	100	120	140	160

- a. Write a function that describes the chirping at a given temperature.
5. The population of Florida was 9.75 million people in 1980 and has been growing steadily ever since.

Year	1980	1981	1982	1983	1984	1985	1986	1987
Population (in millions)	9.75	10.03	10.32	10.62	10.93	11.25	11.57	11.91

- a. Write a function that describes the population growth.
- b. What is the dependent variable? What is the independent variable?
- c. Determine when the population of Florida will reach 20 million.
6. Suppose that a turkey is cooking in the oven. Suppose that the chicken is initially taken directly from the freezer at 32 degrees and put into an oven kept at a constant temperature of 350 degrees. The temperature rises rapidly at first and then increases ever more slowly as the temperature nears the oven temperature of 350. Sketch a graph of the temperature of the turkey with respect to time.

