MATH 125 College Algebra OpenStax Name:_____Section_____

Section 5.8 Modeling Using Variation Professor _____

- **Direct Variation**:

- Find the variation constant and an equation of variation in which y varies directly as x and the following are true.

  $y = 54 \text{ when } x = 12$

  Now find y if x is 4.

  Find x if y is 18.

- Examples:
  The number N of aluminum cans used each year varies directly as the number of people using the cans. If 250 people use 60,000 cans in one year, how many cans are used each year in Dallas, which has a population of 1,189,000?

- **Inverse Variation**:

- Find the variation constant and an equation of variation in which y varies inversely as x and the following are true.

  $y = 14 \text{ when } x = 7$

  Find y if x is 5

  Find x if y is 6

- Examples:
  Work rate. The time *T* required to do a job varies inversely as the number of people *P* working. It takes 5 hr. for 7 bricklayers to build a park wall. How long will it take 10 bricklayers to complete the job?

- Musical pitch. The pitch *P* of a musical tone varies inversely as its wavelength *W*. One tone has a pitch of 330 vibrations per second and a wavelength of 3.2 ft. Find the wavelength of another tone that has a pitch of 550 vibrations per second.

- **Joint Variation**:

- Find the variation constant when and an equation of variation when y varies directly as the square of x and inversely as z when the following are true.
  $y = 100,\ x = 5,\ z = 4$

- C varies jointly as A and T. C = 175 when A = 2100 and T = 4. Find C when A = 2400 and T = 6.