MAT 142, Quiz #7, Spring 2017 Name KEY

Instructions: Show all work. Give exact answers unless specifically asked to round.

1. The height that a ball bounces varies directly as the height from which it was dropped. A tennis ball dropped from a height of 12 inches bounces 8.4 inches. From what height was a tennis ball dropped if it bounces 56 inches?

$y = kx$

$8.4 = k(12)$

$k = \frac{8.4}{12} = .7$

$y = .7x$

$56 = .7x$ $x = 80$ inches

2. The average number of daily phone calls C between two cities varies jointly as their populations P_1 and P_2, and inversely as the square of the distance d between them.
   a. Write an equation that expresses the relationship.

$C = \frac{kP_1P_2}{d^2}$

   b. The distance between San Francisco (pop. 777,000) and Los Angeles (pop. 3,695,000) is 420 miles. If the average number of daily called between the cities is 326,000, find the value of k to two decimal places.

$326{,}000 = \frac{k(777{,}000)(3{,}695{,}000)}{420^2}$

$k = .02$

   c. Memphis (pop. 650,000) is 400 miles from New Orleans (pop. 490,000). Find the average number of daily phone calls between the cities rounded to the nearest whole number.

$C = \frac{.02P_1P_2}{d^2}$ $C = \frac{.02(490{,}000)(650{,}000)}{400^2}$

$= 39{,}813$ calls