

Word Problems Practice

1. The population (in hundreds of thousands) of Florida from 2000 to 2007 can be approximated by the function $f(x) = 3.14x + 160.5$. Similarly, the population (in hundreds of thousands) of New York during the same period can be approximated by the function $g(x) = .43x + 190$.
 - (a) Graph both functions on the same coordinate axis, with $x = 0$ corresponding to the year 2000 and $x = 7$ corresponding to 2007.
 - (b) Do the graphs intersect in this window?
 - (c) If trends continue at the same rate, will Florida overtake New York in population?
 - (d) Estimate in what year Florida will overtake New York in population.

2. Let the supply and demand for bananas in cents per pound be given by

$$\text{supply: } p = \frac{2}{5}q; \qquad \text{demand: } p = 100 - \frac{2}{5}q.$$

- (a) Graph these equations on the same axes.
 - (b) Find the equilibrium quantity.
 - (c) Find the equilibrium price.
 - (d) On what interval does demand exceed supply?
3. Suppose you are the manager of a firm. The accounting department has determined that the cost estimate for a new product is $C(x) = 80x + 7000$. The sales department expects a revenue of $95x$. You know that you can only product at most 400 units.
 - (a) How many units must the firm sell to break even?
 - (b) Should the new product go into production?
 4. Carol Bey makes and sells candy. She has found that the cost per box for making x boxes of candy is given by

$$C(x) = x^2 - 40x + 405.$$

- (a) How much does it cost per box to make 15 boxes? 18 boxes? 30 boxes?
 - (b) Graph the cost function $C(x)$, and mark the points corresponding to 15, 18 and 30 boxes.
 - (c) What point on the graph corresponds to the number of boxes that will make the cost per box as small as possible?
 - (d) How many boxes should she make in order to keep the cost per box at a minimum? What is the minimum cost per box?
5. The rental manager of a small apartment complex with 16 units has found from experience that each \$40 increase in the monthly rent results in an empty apartment. All 16 apartments will be rented at a monthly rent of \$500. How many \$40 increases will produce maximum monthly income for the complex?