

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

There is exactly \$10,000 in a trust fund that is to be invested among three types of bonds, A, B, and C, which yield 5%, 6%, and 7%, respectively, on the investment. The total yield must be at least \$600, no less than \$3000 may be invested in B bonds, and no more than \$2000 may be invested in A bonds.

- 1) If x and y represent the amounts invested in A and B bonds, then the amount invested in C bonds is
- 2) If x and y represent the amounts invested in A and B bonds, which of the following inequalities must be satisfied?
- 3) If x and y represent the amounts invested in A and B bonds, then the maximum possible yield is

Solve the problem.

- 4) Mr. and Mrs. Adams have \$20,000 to invest in low-risk, medium-risk, and high-risk stocks. They decide that at least \$10,000 must be invested in low-risk stocks, at least \$1000 must be invested in medium-risk stocks, and no more than \$5000 can be invested in high-risk stocks. The expected yields on the stocks are 6% for low-risk, 8% for medium-risk, and 10% for high-risk. Mr. and Mrs. Adams will choose the amount to invest in each type of stock in order to maximize the yield on their investment.
 - (a) Name in words the three quantities that must be determined.
 - (b) Write the three quantities in (a) algebraically using only the variables x and y .
 - (c) Write the complete set of inequalities needed to solve the problem.
 - (d) Write the objective function.

New cars are transported from docks in Baltimore and New York to dealerships in Pittsburgh and Philadelphia. The dealership in Pittsburgh needs 20 cars and the dealership in Philadelphia needs 15 cars. It costs \$60 to transport a car from Baltimore to Pittsburgh, \$45 to transport a car from Baltimore to Philadelphia, \$65 to transport a car from New York to Pittsburgh, and \$40 to transport a car from New York to Philadelphia. There are 30 cars on the docks in Baltimore and there are 18 cars on the docks in New York. The number of cars sent from each dock to each dealership is chosen to minimize total transportation costs.

- 5) If x represents the number of cars sent from Baltimore to Philadelphia and y represents the number of cars sent from New York to Pittsburgh, then the number of cars sent from Baltimore to Pittsburgh is given by
- 6) If x represents the number of cars sent from Baltimore to Philadelphia and y represents the number of car sent from New York to Pittsburgh, then the objective function is
- 7) If x represents the number of cars sent from Baltimore to Philadelphia and y represents the number of cars sent from New York to Pittsburgh, which of the following inequalities must be satisfied?

Solve the problem.

- 8) Tee-Tops Inc. has warehouses in San Francisco and Oakland and some stores in Berkeley and San Jose. The Berkeley store needs 4000 tee shirts and the San Jose store needs 7000 tee shirts. The Oakland warehouse has 9000 tee shirts, whereas the San Francisco warehouse has 8000 tee shirts. The cost of shipping a tee shirt from Oakland to Berkeley is \$0.05, from Oakland to San Jose \$0.15, from San Francisco to Berkeley \$0.03, and from San Francisco to San Jose \$0.12. The number of tee shirts that are shipped from each warehouse to each store is chosen in order to minimize shipping costs.
 - (a) Define the variables.
 - (b) Write the system of linear inequalities used in solving the problem.
 - (c) Write an algebraic expression for the objective function.

- 9) A small-appliance manufacturer has plants in Baltimore and Philadelphia, each of which produces toasters and blenders. The Baltimore plant can produce at most 800 appliances in one day at a cost of \$12 per toaster and \$15 per blender. The Philadelphia plant can produce at most 500 appliances in one day at a cost of \$10 per toaster and \$20 per blender. A rush order is received for 600 toasters and 300 blenders. The manufacturer will choose the number of toasters and blenders produced at each plant in order to minimize costs.
- (a) Name in words the four quantities that must be determined.
 - (b) Express the four quantities in (a) algebraically using only the two variables, x and y .
 - (c) Write the complete system of inequalities (in terms of x and y) needed to solve the problem.
 - (d) Write the objective function in terms of x and y .