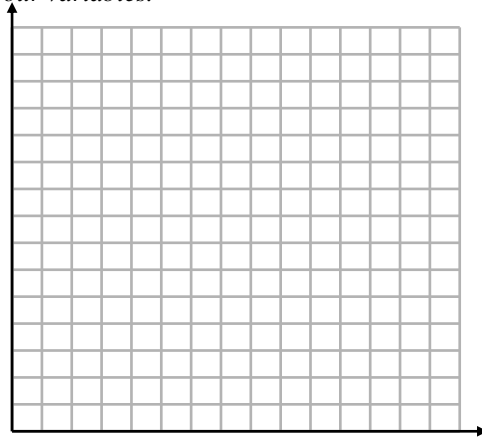# Systems of Linear Inequalities Applications

Name_____

1.  The cheerleaders are selling t-shirts in order to raise money.  The cost of a t-shirt is $15 for adults and $10 for students.  The cheerleaders need to raise at least $3,000 and have only 250 t-shirts.

a.  Write a system of linear inequalities that represents the situation.  *Identify your variables.*
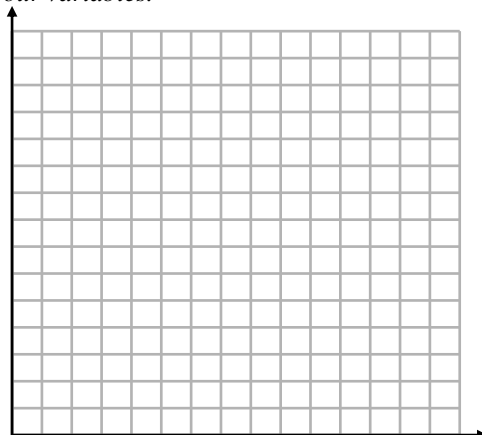
b. Graph and label the system in the coordinate plane.

c.  There was a high demand for student shirts and they sold 211 student shirts.  The remaining shirts they sold were adult shirts.  Use the graph to explain whether the cheerleaders were able to meet their goal.

2.  Sarah is selling bracelets and earrings to make money for a summer science camp she wants to attend.  The bracelets sell for $2 and earrings sell for $3.  She needs to make at least $500.  Fifty people have already signed up to buy bracelets from Sarah and more are interested.

a.  Write a system of linear inequalities that represents the situation.  *Identify your variables.*
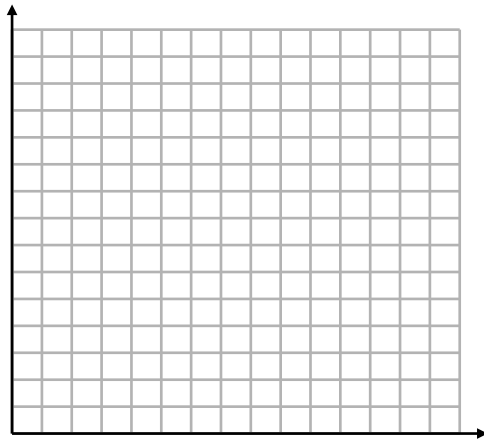
b. Graph and label the system in the coordinate plane.

d.  Explain what the shaded region means in terms of the problem.

e.  Sarah sells 150 bracelets and 100 earrings.  Use the graph to explain if Sarah meets her goal.

3. A grocer buys cases of almonds and walnuts. Almonds are packaged 20 bags per case. The grocer pays $30 per case of almonds and makes a profit of $17 per case. Walnuts are packaged 24 bags per case. The grocer pays $26 per case of walnuts and makes a profit of $15 per case. He orders no more than 300 bags of almonds and walnuts together at a maximum cost of $400.

a. Write a system of linear inequalities that represents the situation. *Identify your variables.*

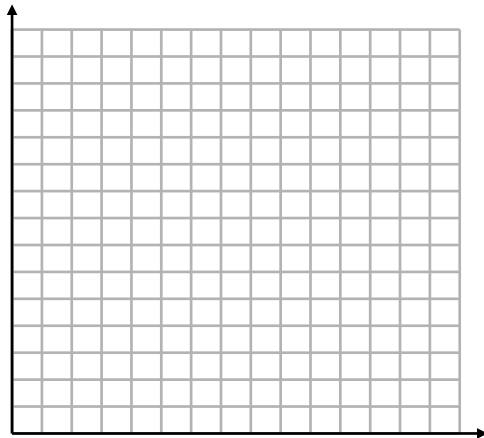b. Graph and label the system in the coordinate plane.

c. Identify the vertices of the bounded region.

d. Explain what the shaded region means in terms of the problem.

e. Write and solve a profit function to determine the number of cases of almonds and walnuts the grocer should order to maximize his profit. *Justify your answer algebraically and with a complete sentence.*

4. A calculator company produces a scientific calculator and a graphing calculator. Long-term projections indicate an expected demand of at least 100 scientific and 80 graphing calculators each day. Because of limitations on production capacity, no more than 200 scientific and 170 graphing calculators can be made daily. To satisfy a shipping contract, a total of at least 200 calculators must be shipped each day.

a. Write a system of linear inequalities that represents the situation. *Identify your variables.*

b. Graph and label the system in the coordinate plane.

d. Identify the vertices of the shaded region.

e. If each scientific calculator sold results in a $2 loss, but each graphing calculator produces a $5 profit, how many of each type should be made daily to maximize net profits? *Justify your answer algebraically and with a complete sentence.*

5.  A farmer has 240 acres to plant.  He needs to decide how many acres of corn to plant and how many acres of oats.  He can make $40 per acre profit for corn and $30 per acre for oats.  However, the corn takes 2 hours of labor per acre to harvest and the oats only take 1 hour per acre.  He only has 320 hours of labor he can invest.  How many acres of each should he plant to maximize his profit?
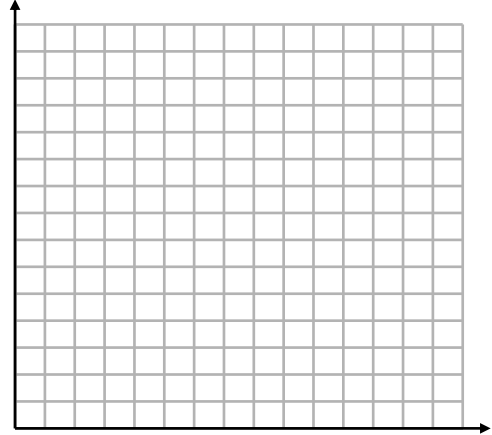
6.  Bob builds tool sheds. He uses 10 sheets of dry wall and 15 studs for a small shed and 15 sheets of dry wall and 45 studs for a large shed. He has available 60 sheets of dry wall and 135 studs. If Bob makes $390 profit on a small shed and $520 on a large shed, how many of each type of building should Bob build to maximize his profit?