Name _____ Date _____

6. Landscape Design I *(continued)*

4. Calculate the area of your region.

Area of your region: _____

Why is the unit of measurement squared?

_____

_____

Determining Cost

Sod is priced per pallet; one pallet covers 450 square feet and costs $95.

Step 1. Calculate the cost of the sod, taking into account the cost and the total area to be covered.

Cost of sod: _____

Step 2. Sod is just one of the costs you have to consider. You also have to factor in labor costs. To do this, assume that it will take two workers about one hour to lay sod over 1500 square feet. Workers are paid $11 per hour.

Direct labor costs: _____

Step 3. You will also have to take into account other indirect or overhead costs such as advertising, employee benefits, taxes, and transportation, to name a few. Add 12% to the sod and labor costs for indirect costs.

Indirect costs: _____

Step 4. Keep in mind that you have to make money on the deal. Your company normally adds an additional 8% profit margin.

Amount of profit margin: _____

Step 5. Add the amounts from steps 1–4 together to arrive at the bid amount.

Bid amount: _____

Turn the bid amount in to the teacher for consideration.

Name _____ Date _____

7. Landscape Design II *(continued)*

Sprinkler Specifications

Sprinkler	Coverage Zone (degrees)	Radius (feet)	Gallons per Minute (GPM)	Cost per Sprinkler
A	90°	5	0.8	$2.00
B	90°	10	1.2	$2.50
C	90°	15	2.0	$3.00
D	180°	5	1.6	$3.25
E	180°	10	2.4	$4.00
F	180°	15	4.0	$4.50
G	270°	5	2.1	$4.75
H	270°	10	2.9	$5.25
I	270°	15	4.5	$6.00
J	360°	5	4.2	$6.25
K	360°	10	6.1	$7.00
L	360°	15	7.9	$7.50

Formula for precipitation rate

$$P_r = \frac{96.25 \times Total\ GPM}{Area}$$

P_r *is precipitation rate in inches per hour.*

96.25 *is a constant that converts gallons per minute to inches per hour.*

GPM *is the cumulative flow from all sprinklers in the specified zone.*

Area *is in square feet.*

Name _____ Date _____

7. Landscape Design II *(continued)*

Sprinkler Design

Step 1: Divide your region into as many large rectangles or squares as you can. Place sprinklers around the perimeter of each figure, making sure that you have head-to-head coverage and are maintaining a 0.5-inch-per-hour precipitation rate. Along some perimeters it might work best to use 360° sprinklers.

Step 2: Place sprinklers in the remaining areas. Again, remember to have head-to-head coverage and maintain 0.5-inch-per-hour precipitation rate.

Step 3: On your scale drawing, use a compass to show that the coverage area for each sprinkler provides head-to-head coverage.

Costs

1. To find the cost of the sprinklers, multiply the number of each type of sprinkler used by the price for that sprinkler type.

   Cost of sprinklers: _____

2. Piping costs $.79 per foot. For every 10 feet of pipe, a valve is needed. Valves cost $2.40 each.

   Cost of piping and valves: _____

3. As with the sod, take into account the cost of labor. Assume that, for every 10 feet of pipe, labor will cost $22.

   Cost of labor: _____

4. You will also have to take into account other indirect or overhead costs such as advertising, employee benefits, taxes, and transportation, to name a few. Add 12% to the labor and other costs for indirect costs.

   Indirect costs: _____

5. Also, keep in mind that you have to make money on the deal. Your company normally adds an additional 8% profit margin.

   Profit margin: _____

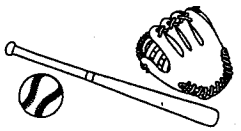
6. Add the total from questions 1–5 together to arrive at the sprinkler system cost amount.

   Cost of sprinkler system: _____

(continued)

Name _____ Date _____

1. The Grass Is Greener



You are a baseball coach at a large high school. You are about to write a memo to the athletic director (AD) requesting funding to resod the baseball field. Because the Athletic Department's budget is always very tight, you know that the AD will ask you to carefully document the costs that you submit. Devise and carry out a plan to calculate how much sod you will need for the baseball field. Use the baseball field at your school as a model for making the plan.

Sod Information

- One roll of sod covers 40 square yards.
- Price per roll is $98.

Make a Plan

1. Consult with the other members of your group. Devise a strategy to determine the amount of sod you will need for the baseball field. The following formulas may prove useful (b=base; h=height; s=side; r=radius; N=a central angle measuring $N°$):

   - Area of a triangle — $\frac{1}{2}bh$
   - Area of a trapezoid — $\frac{1}{2}h(b_1 + b_2)$
   - Area of a rectangle — bh
   - Area of a circle — πr^2
   - Area of a square — s^2
   - Area of a sector — $\frac{N}{360}\pi r^2$

2. On a separate piece of paper, describe your plan for measuring the baseball field. Have your teacher approve the plan by initialing it.

3. Carry out your plan and measure the baseball field.

4. Review the plan you gave to the teacher. Describe any modifications you had to make to your original plan after you started measuring.

5. What are the dimensions of the baseball field? _____

6. How many square feet of sod will you need? _____

7. How many rolls of sod will you request? _____

8. What is the total cost of the sod? _____

9. Draft a memo to the athletic director stating your request. Include an enclosure showing how you arrived at your cost.