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Calculating the Amount of Fertilizer Needed for Your Lawn

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General recommendations for fertilizing lawns are normally given in pounds of nitrogen (N) to be applied per 1000 square feet (sq ft). But fertilizer formulations vary in their N content, and lawns are seldom exactly 1000 sq ft in area. This publication is intended to help you determine how much fertilizer to apply to your lawn to provide the nutrients it needs.

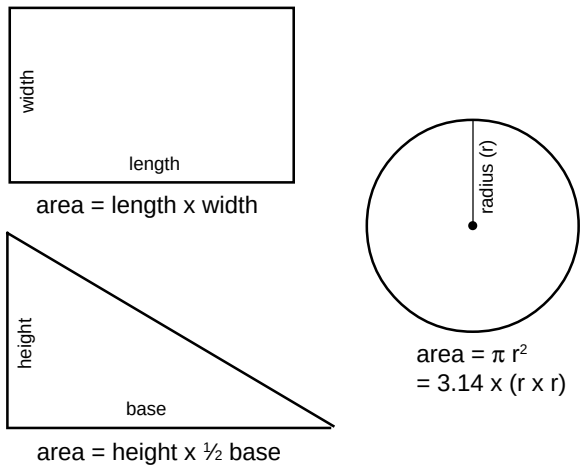
Recommended amounts of nutrients vary with the type of grass and, to some extent, with the type of soil. The CTAHR publications listed on p. 2 can help you determine the appropriate rates of fertilizer to apply to a particular lawn.

Step 1. Calculate the area of the lawn

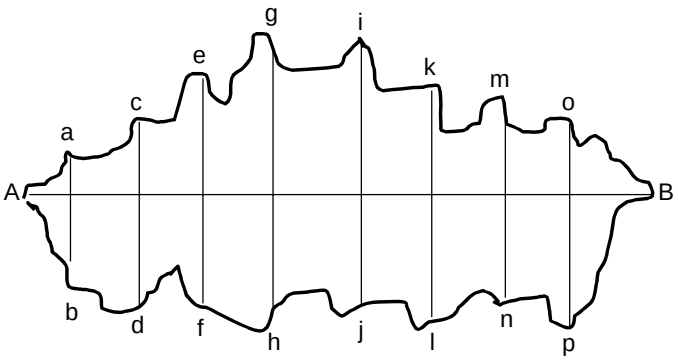
The first step is to calculate the number of square feet of lawn area to which you are going to apply fertilizer. This can usually be done with some simple geometry. If the lawn is a square or rectangle, multiply the length and width (in feet). For a triangular area, multiply the height by one-half the base. If the area is circular, take the radius of the circle, square it, and multiply that by pi. An irregular lawn can often be divided into sections of various shapes; calculate the areas of the subdivisions, and add their areas together to get the total area. Don't include areas that are not covered with grass (walkways, structures, landscaped beds).

In some cases the lawn cannot easily be subdivided into simple geometric figures. In such cases, you can estimate the square footage of the area with a method known as the "offset" method. First, measure the longest dimension of the lawn's shape (line AB in the figure at right). Divide that length into roughly equal sections. Then, at each point of division of line AB, and perpendicular to it, measure the distance from edge to edge of the lawn. Add each of these distances (ab, cd, etc.) and divide by the number of measurements to get an average distance (the more measurements made, the more accurate will be the total area determined by this method). Then use the formula given with the figure at right to calculate the area.

Calculating the area of simple geometric shapes.



Calculating the area of a complex shape.



Area of irregular shape = L x Z, where L = the distance AB, and Z = the average of the lengths measured perpendicular to AB (the sum of ab, cd, ef, etc., divided by the total number of perpendicular lengths measured; in this case, 8).

Example:
AB = 45 ft = L
The sum of the measurements ab, cd, ef, etc. = 911 ft
911 ft ÷ 8 = 114 ft = Z
L x Z = 45 ft x 114 ft = 5130 sq ft

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Step 2. Determine how much N is in the fertilizer

The second step is to determine the percentage of N in your fertilizer and determine the standard rate, the amount of that fertilizer needed to deliver 1 lb of N per 1000 sq ft. The percentage of N can be found on the fertilizer bag as the first number of the fertilizer's "NPK" formulation. Most fertilizer formulations are identified by a three-number code that gives the percentages of nitrogen as elemental N, phosphorus (P) as phosphate (P_2O_5), and potassium (K) as potassium oxide (K_2O). Lawn fertilizers are normally high in N. A formulation labeled 20-5-10 has 20 percent N, so 100 lb of that fertilizer contains 20 lb of N. Table 1 lists the amounts of fertilizer needed to deliver 1 lb of N to 1000 sq ft at fertilizer N contents ranging from 1 to 46 percent. Use the table to find out how much of your fertilizer formulation will deliver 1 lb of N, and then multiply that amount by the recommended application rate.

Example 1

Recommendation: Apply N at 1 lb/1000 sq ft. Your fertilizer contains 20 percent N. Table 1 indicates that you need to apply 5 lb of this fertilizer to deliver 1 lb of N per 1000 sq ft.

Example 2

Recommendation: Apply N at 2 lb/1000 sq ft. Your fertilizer contains 31 percent N. Table 1 indicates that you need to apply 3.2 lb of this fertilizer per 1000 sq ft to deliver 1 lb N. In order to deliver 2 lb N per 1000 sq ft, double this amount: 2 x 3.2 = 6.4 lb/1000 sq ft.

Always read the directions on the fertilizer package thoroughly to ensure that you are using the product as it was designed to be used. Most inexpensive fertilizers are readily soluble, and a typical recommendation for these formulations is to use only 1 lb of N per 1000 sq ft in any single application. Greater amounts can "burn" the grass, result in rank growth, or be wasteful if the nutrients are leached beyond the root zone before they can be taken up by the turf. These fertilizer losses also contribute to pollution of groundwater and the environment.

Controlled release fertilizers provide nutrients over a longer period and may be applied in greater amounts—and thus less frequently—than soluble fertilizers. Controlled release fertilizers are more efficient in delivering nutrients to your lawn, and they can minimize environmental damage when properly applied.

Step 3. Determine how much fertilizer to apply to your lawn

The final step is to multiply the total square feet of your lawn (Step 1) by the amount of fertilizer needed to achieve the N application recommended (Step 2).

Example: The recommendation for your lawn is to apply 2 lb of N per 1000 sq ft. Your lawn fertilizer product is labeled 25-6-10. The lawn area is found to be 3720 square feet. From Table 1, 4 lb of a fertilizer with 25 percent N is applied per 1000 square feet to deliver 1 lb of N, so you will need 8 lb of that fertilizer to deliver 2 lb of N. Your lawn is 3.72 times larger than 1000 sq ft (3720 divided by 1000), so you will need 3.72 times that amount of fertilizer to cover the entire lawn area. Thus you must apply 3.72×8 lb, or about 30 lb of fertilizer to deliver 2 lb N per 1000 sq ft to your lawn.

Table 1. For fertilizers of various N content, find the amount of fertilizer to apply to deliver 1 lb of N to 1000 sq ft.

N content (%)	Amount (lb)	N content (%)	Amount (lb)
1	100	24	4.2
2	50	25	4.0
3	33.3	26	3.8
4	25	27	3.7
5	20	28	3.6
6	16.7	29	3.4
7	14.3	30	3.3
8	12.5	31	3.2
9	11.1	32	3.1
10	10	33	3.0
11	9.1	34	2.9
12	8.3	35	2.9
13	7.7	36	2.8
14	7.1	37	2.7
15	6.7	38	2.6
16	6.3	39	2.6
17	5.9	40	2.5
18	5.6	41	2.4
19	5.3	42	2.4
20	5.0	43	2.3
21	4.8	44	2.3
22	4.5	45	2.2
23	4.3	46	2.2

Useful CTAHR publications on lawns and turfgrasses: This and other CTAHR publications can be found at the Web site <www2.ctahr.hawaii.edu/oc/freepubs> or ordered by calling 808-956-7046 or sending e-mail to ctahrpub@hawaii.edu. In particular, see the publications *Common lawn grasses for Hawaii* (II-22), *Testing your soil, why and how to take a soil-test sample* (AS-4), *Adaptation of turfgrasses in Hawaii* (TM-4), *St. Augustinegrass* (TM-3), *Bermudagrass* (TM-5), *Maintaining bermudagrass athletic fields* (TM-6), and *Zoysiagrass* (TM-8).