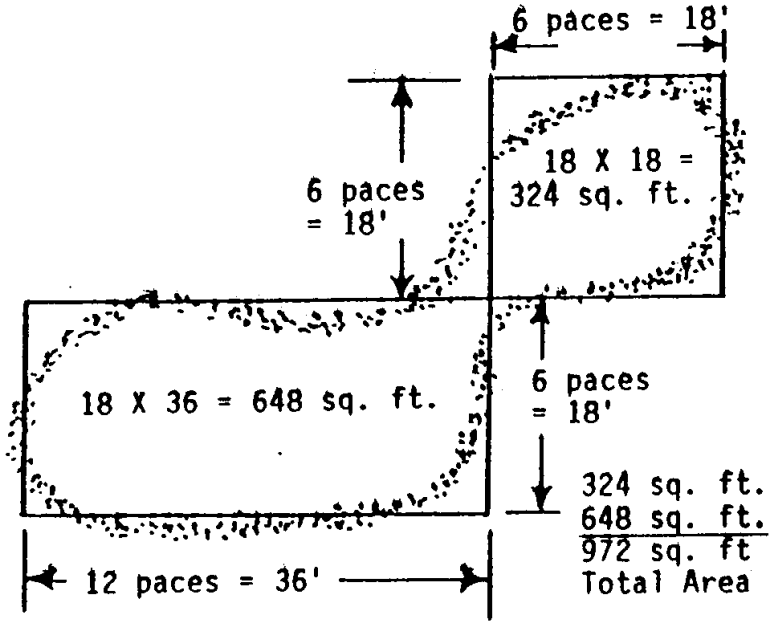
HOW TO MEASURE AN AREA

A. Stepping Off and Calculating Approximate Areas



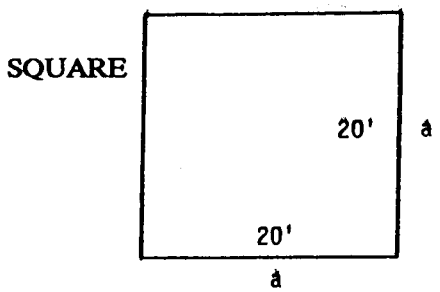
B. Comprehensive Calculations (*Portions taken from the University of California Publication 4053.

Areas of turfgrass that require treatment are generally much smaller than those treated in agriculture. So, measurements, calculations, and directions must be followed as closely as possible when applying fertilizer in order to avoid overuse of the material. Here we explain how to calculate areas and how to determine fertilizer applications for different size plots when directions are given only for large acreages.

Two determinations must be made before treating any given area one is the size of the area to be treated, and the other is the precise amount of the fertilizer to be used. Frequently, unsatisfactory control is blamed on the fertilizer used, when, in fact, failure is due either to wrong calculations of the sum of the area to be treated or the amount of fertilizer to be applied or both.

Examples and Calculations

Determining the size of a given area can be simplified by dividing it into regular geometric shapes, assigning letters, such as a, b, c, d, and the like, to represent their dimensions, and using the formulas given in this section. Generally, any area can be considered as a square or rectangle. Odd extremities of an area (A) can be visualized as measurable triangles or circles. For example, the fairways of a golf course can be visualized as rectangles, its tem as squares, and its greens, lakes, and water reservoirs as circles.

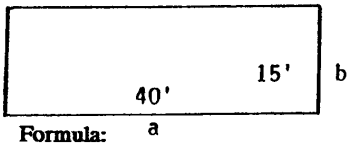


Formula:

Area = a x a, where
a = height and width

Example: a = 20 ft.
Area = 20 ft. x 20 ft. = 400 sq. ft.

RECTANGLE



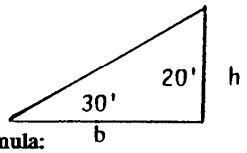
Formula:

Area = a x b, where
a = length, and
b = height (or width)

Example: **a = 40 ft.**
b = 15 ft.

Area = 40 ft. x 15 ft. = 600 sq. ft.

TRIANGLE



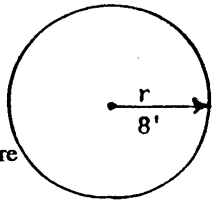
Formula:

Area = $\frac{h \times b}{2}$

Example:

Area = $\frac{20 \text{ ft.} \times 30 \text{ ft.}}{2}$ = 300 sq. ft.

CIRCLE



Formula:

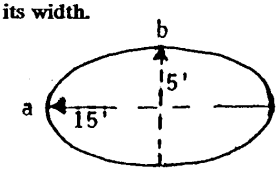
Area = π x r^2, where
π = 3.14
r = radius

Example: **π = 3.14; r = 8 ft.**

Area = 3.14 x 8 ft. x 8 ft. = 200.96 sq. ft.

ELLIPSE

If the geometric shape resembles an ellipse rather than a circle, the formula Area = 0.7584 x a x b is used, with "a" representing the length of the ellipse and "b" the shorter length or what may be considered its width.



Formula:

Area = 0.7854 x a x b, where
a = length of the ellipse, and
b = shorter dimension (width)

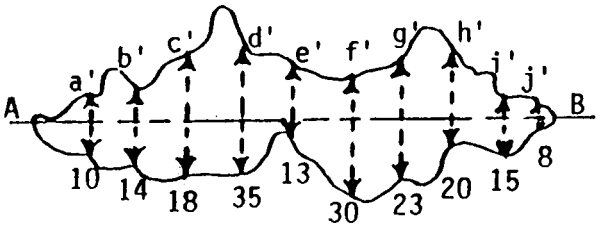
Example: **a = 15 ft.**
b = 5 ft.

Area = 0.7854 x 15 x 5 = 58.9 sq. ft.

IRREGULARLY-SHAPED AREAS

Method I.

Determination of a very irregularly-shaped area can be obtained by establishing the longest line possible lengthwise through the center of the area. Numerous lines are then established perpendicular to this center line. The total number of lines will depend upon how irregular the shape of the area may be. The more irregular it is, the more lines should be drawn. From the average length of all these lines, the width of the area is determined and the area calculated as a rectangle.



Formula:

Area = a x b, where

a = distance between A and B, and

b = average of all lengths a' to j'

(lines are drawn perpendicular to a)

Example:

a' =	10 ft.
b' =	14 ft.
c' =	18 ft.
d' =	35 ft.
e' =	13 ft.
f' =	30 ft.
g' =	23 ft.
h' =	20 ft.
i' =	15 ft.
j' =	8 ft.
Total =	186 ft.

a = 128 ft.

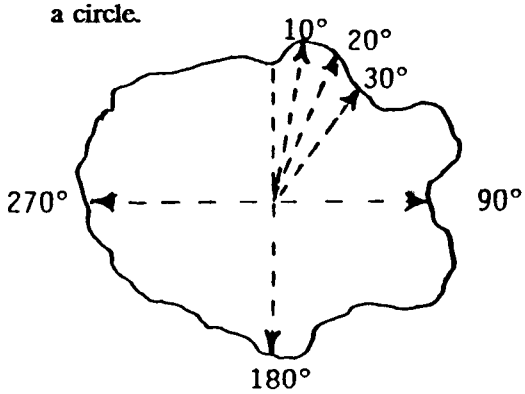
b = 18.6 ft. (186 ÷ 10)

Area = 128 x 18.6 = 2380.8 sq. ft.

Method II.

Another method for determining the size of an irregularly-shaped area (a golf green, for example) is to establish a point as near to the center of the area as can be estimated. From this point, as with a compass, distances for each 10-degree increment are measured to the edge of the irregularly-shaped green. Then, the 36 measurements taken completely around the central point are averaged. The idea is to obtain an average measurement, and that measurement becomes the radius of the circle. The diameter (d) of the circle is found by multiplying its radius by 2. The area then is computed using the formula for a circle.

a circle.



Formula:

Area = 0.7854 x d x d, where
d = average r x 2

Example:

Degrees		Distance (ft.): center to periphery
10	(r^1).....	54.8
20	(r^2).....	43.9
30	(r^3).....	48.4
40	(r^4).....	46.9
330	(r^{33})....	41.5
340	(r^{34})....	48.6
350	(r^{35})....	51.0
360	(r^{36})....	50.0
	Total	1980.0

r = 55 (1980 ÷ 36)
d = 110 (r x 2)

Area = 0.7854 x 110 x 110 = 9503.34 sq. ft.