

A NEW WAY TO CALCULATE THE LENGTH OF A COMMON ROAD AMONG SHARES NUMBER WHEN DIVIDING LANDS

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Article history:	Abstract:
Received: 08 th December 2023	<p>The study was conducted on the land shown in Figure (1) its dimensions were 200 × 300 m, drawn by scale of 1/1000, it was divided into 4 shares after calculating the length of the shared route, it was 5 meters wide and 150.63 meters long, which starts from the side that was 300 meters long. The share of one lot was 14,800 m² with a percentage error of 0.011% according to the equation given in Al-Subaihi (2008) by applying equation (1) as follow:</p> $Q = \frac{(S - 1)LW}{SL - R} \dots \dots (2)$ <p>S: The share number the total area of the land was divided (4 shares).</p>
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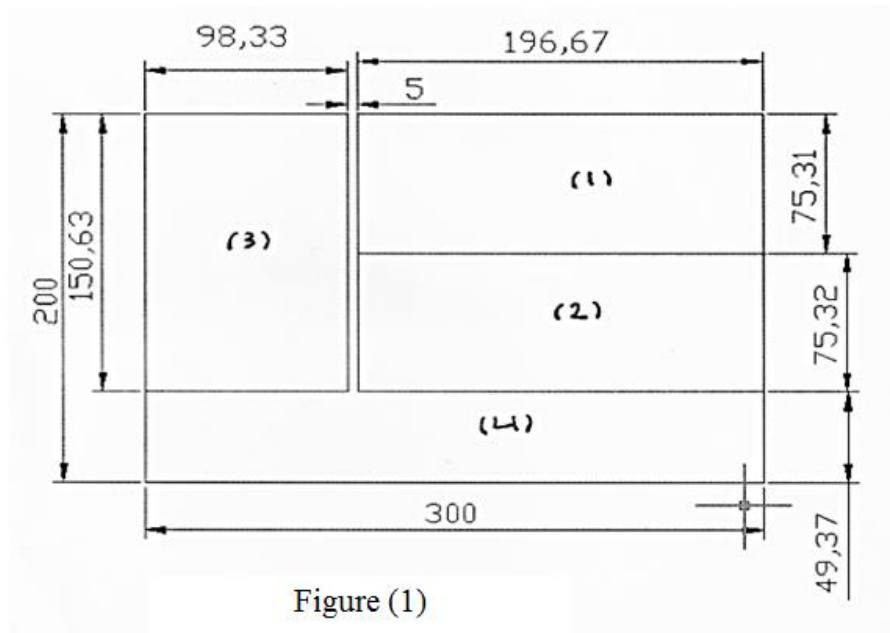


Figure (1)

INTRODUCTION

Land is divided in many cases, the most important of which is the distribution of land for the purposes of housing, agriculture and urban planning, in addition to resolving Inheritance problems and other cases, in each of the above cases, it must be taken into account whether each section or share of land after its division benefits from public benefits, such as transmission and power lines, irrigation and drainage canals. Another important matter that must be taken into consideration when dividing land, it is the creation of a common road between those departments or shares, so that all these departments can benefit from it, this requires calculating the length of that path first, then calculate the area deducted from the total area of land required for its construction, the remainder of the total area is then distributed according to the prescribed sections or shares, so that the condition of all shares benefiting from the common road equally is met, by ending the length of the road within the limits of the space of the last share, at the same time, it serves as a corridor for the rest of the lessons, Therefore, this research is concerned with finding a

ready-made mathematical formula by which the length of the common road can be calculated after determining its width based on the shares into which the land area will be divided.

MATERIALS AND METHODS

field survey of the plot of land located approximately 22 kilometers north of the town of Rumaitha, shown in Figure (1), was conducted during the period 1-11 July. The following was conducted:

1- Surveying the land directly using the method described in Al -Khafaf (2000), which includes the use of a linen tape 20 meters long, metal pegs 30 centimeters long, (3) arrows (30) long, (3) ranging poles 2 meters long, and a plumb bob. The distances were measured according to The equation given in Al -Eushrii (2000)

Total distance measured = (length of measuring tape used x number of times measured) + remaining distance

The number of measurement times = the number of arrows used x the number of replacement times x the difference between the used and remaining arrows

2- Measuring the total area of the plot of land indicated in Figure (1) and the area of each share after dividing it using the following equation contained in the cadastral calculation (2009)

Rectangular area = length x width

3- Calculate the percentage of error

The percentage error between the calculated area and the real area was calculated using the following equation given in Al-Subaihi (2008):

Error percentage = (real area - calculated area / real area) x 100

4- Drawing a plot of land whose dimensions are 300 meters x 200 meters using AutoCAD version 2009 and at a drawing scale of 1/1000.

RESULTS AND DISCUSSION

The common road length Q for the plot of land shown in Figure (1) can be calculated using equation (1):

$$Q = \frac{(S - 1)LW}{SL - R} \dots \dots \dots (2)$$

Q = length of the common road

L=the length of the side from which the common road will be constructed

R = length of the other side

S = the number of shares into which the land will be divided

W = common road width

Equation (2) can be derived as follows, as shown in Figure (2), assuming that the total area of the land has been divided into 3 equal shares, namely A1, A2, and A3, respectively.

$$A_3 = L (W - Q)$$

$$A_2 = A_1 = \frac{Q(L-R)}{2}$$

Since A1 = A2 = A3

$$L(W - Q) = \frac{Q(L-R)}{2}$$

$$LW - LQ = \frac{LQ-RQ}{2}$$

When the means are multiplied by the two sides:

$$LQ - RQ = 2LW - 2LQ$$

$$LQ - RQ + 2LQ = 2LW$$

$$Q(L - R + 2L) = 2LW$$

$$Q(3L - R) = 2LW$$

$$Q = \frac{2LW}{3L - R} \dots \dots \dots (1)$$

Equation (1) was derived assuming that the plot of land was divided into 3 shares, meaning S=3. However, if the number of shares is more than 3, then equation (1) can be modified to the formula shown in equation (2), given that the common road ends at the border of the last lot A3 and at the same time it is a corridor for the rest of the lots A1 and A2, where (S) is in equation (2). is equal to the number of shares. If the number of shares is 3, then the value of the quantity (S -1) is equal to 2. This is clear in equation (1)

$$Q = \frac{(S-1)LW}{SL-R} \dots \dots \dots (2)$$

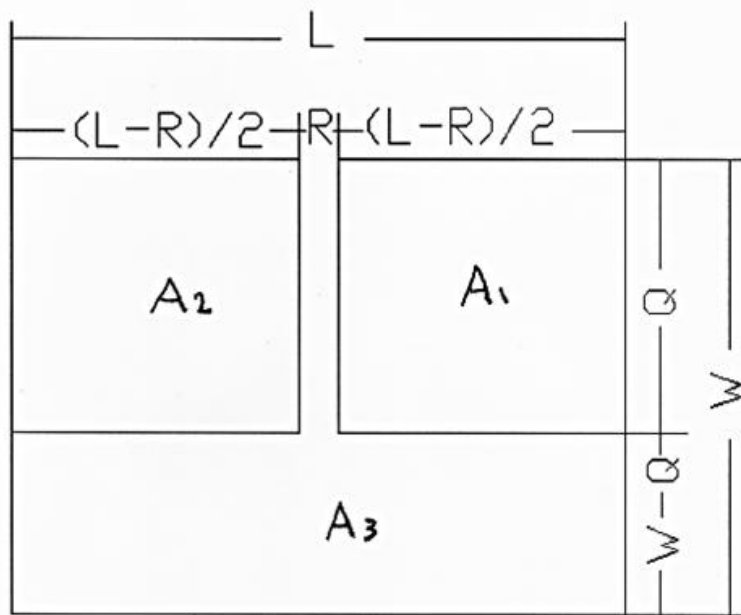


Figure (2)

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