is contained in the base of the larger one five times. Hence, if we fit a series of such small triangles along the line of sight as in figure 3, there would be evidently five of them. The base of the

Fig.3

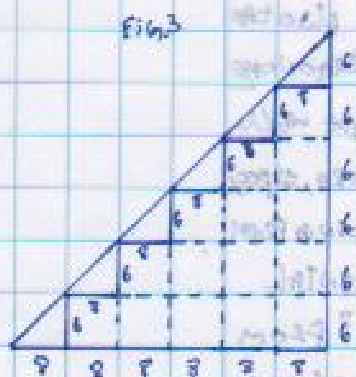
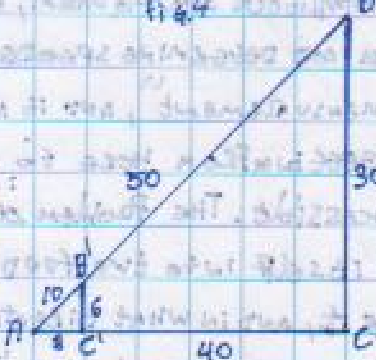



Fig.4




smaller triangle bears the same relationship to the total distance from the foot of the tree as the hight of the pole bears to the hight of the tree, that is, 8/40 is equal to 6/30. Such triangles are said to be similar, that is, alike in shape. Their corresponding sides are proportional and their corresponding angles are equal.

87. The trigonometric functions.

Our example serves as a key to understanding certain fundamental relations between the sides and angles of any right triangles which have a common acute angle. Consider the two triangles ABC and AB'C' in figure 4. Each side of triangle ABC is exactly five times as large as the corresponding side of triangle AB'C'. Another way to show this relation is to equate corresponding ratios in two triangles as follows: p61

$$\frac{AC'}{AB'} = \frac{AC}{BC} \qquad \frac{C'B'}{AB'} = \frac{CB}{AB} \qquad \frac{C'B'}{AC'} = \frac{CB}{AC}$$

or, in terms of the example above:

$$\frac{8}{10} = \frac{40}{50} \qquad \frac{6}{10} = \frac{30}{50} \qquad \frac{6}{8} = \frac{30}{40}$$

These ratios are not dependent upon the area of the right triangles; they are dependent only upon the angle A. That is, they are the same for all such right triangles, AB'C' and ABC, which have the common angle A. We call these ratios