

Answer on Question #38794, Physics, Mechanics | Kinematics | Dynamics

A worker bee flies 504m south from a rose garden to the hive; she gets the message that there are many more flowers 993m southeast. How far is it from the first flower field to the second?

Solution.

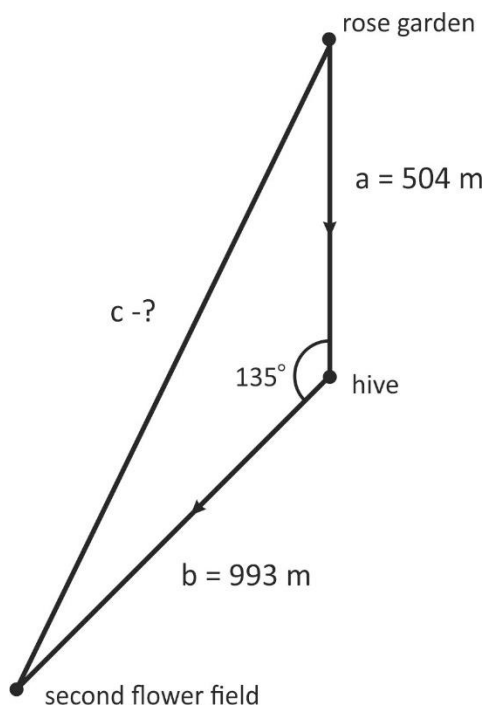
We introduce the following notation.

$a = 504$ m (distance from a rose garden to the hive),

$b = 993$ m (distance from a hive to the second flower field),

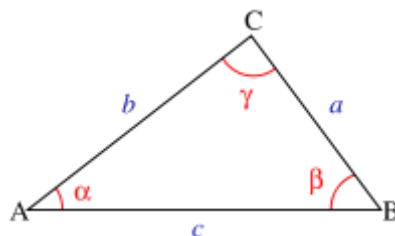
$c = ?$ (distance from the first flower field to the second flower field),

$\gamma = 135^\circ$ (angle between the direction to the south and south-east direction).



I give the formula for the Law of Cosines and use it to find the missing side length of a triangle.

$$c^2 = a^2 + b^2 - 2ab \cos \gamma$$



$$c^2 = 504^2 + 993^2 - 2 \cdot 504 \cdot 993 \cdot \cos(135^\circ)$$

$$\cos(135^\circ) = -0.7071$$

$$c^2 = 1947832.5$$

$$c = \sqrt{1947832.5} = 1395.65 \approx 1396 \text{ m.}$$

Answer. 1396 m.