Answer on Question #68291-Physics-Mechanics | Relativity

A dog in an open field runs 10.0 m east and then 27.0 m in a direction 54.0 ◦ west of north.

Part A

In what direction must the dog then run to end up 12.0 m south of her original starting point?

Part B

How far must the dog then run to end up 12.0 m south of her original starting point?

Solution

A.

$$d_x = -10.0 - (-27.0 \sin 54.0) = 11.844$$

$$d_y = -12.0 - (27.0 \cos 54.0) = -27.870$$

The direction is

$$\theta = \tan^{-1}\left(\frac{11.844}{27.870}\right) = 23.0° \; south \; of \; east.$$

B.

$$d = \sqrt{(11.8447)^2 + (-27.870)^2} = 30.3 \; m.$$