Question #82770, Physics / Other

A boat leaves a port heads north 1hr. changes course heads west for 0.5hr. changes again heads south east for another 0.5hr. During all time boat is affected by 2mph current in direction northeast. Boat speed in 12mph. Find distance between boat and port. Solve graphically

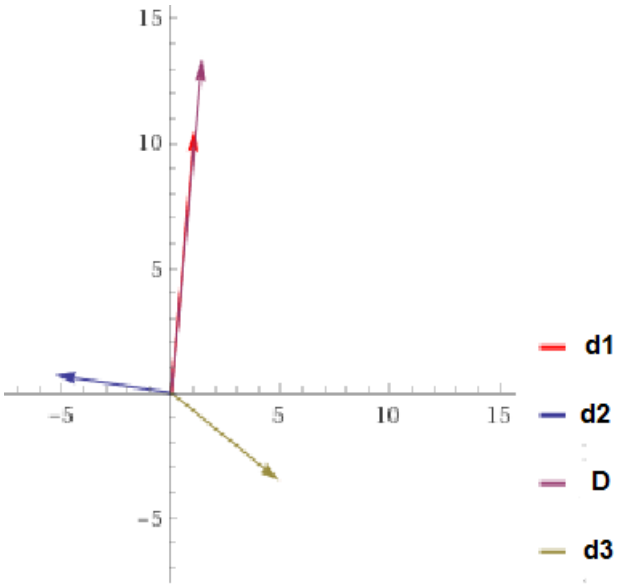
Solution

$$\boldsymbol{d_1} = (\boldsymbol{v_1} + \boldsymbol{V})t_1 = \big((0,12) + (2\cos 45\,, 2\sin 45)\big)1 = (1.414,13.414)\ miles$$

$$\boldsymbol{d_2} = (\boldsymbol{v_2} + \boldsymbol{V})t_2 = \big((-12,0) + (2\cos 45\,, 2\sin 45)\big)0.5 = (-5.293,0.707)\ miles$$

$$\boldsymbol{d_3} = (\boldsymbol{v_3} + \boldsymbol{V})t_3 = \big((12\cos 45\,, -12\sin 45) + (2\cos 45\,, 2\sin 45)\big)0.5 = (4.950,-3.535)\ miles$$

$$\boldsymbol{D} = (1.414,13.414) + (-5.293,0.707) + (4.950,-3.535) = (1.071,10.586)\ miles$$



The distance between boat and port is 10.6 miles.