1. Runner *A* is initially 6.8 km west of a flagpole and is running with a constant velocity of 5.4 km/h due east. Runner *B* is initially 4.4 km east of the flagpole and is running with a constant velocity of 3.8 km/h due west. What will be the distance of the two runners from the flagpole when their paths cross?

$l_1 = 6.8\,km$	*Solution.*
$v_1 = 5.4\dfrac{km}{h}$	Let introduce the coordinate system with X-axis in the direction to east. Let the flagpole be the center of this coordinate system.
$l_2 = 4.4\,km$	The initial coordinates of the runners are $x_A = -6.8$ and $x_B = 4.4$, respectively.
$v_2 = 3.8\dfrac{km}{h}$	The equations of the movement of the runners are: $x_1 = x_{1A} + v_{Ax}\cdot t,\quad x_2 = x_{1B} + v_{Bx}\cdot t,$
$d - ?$	

where $v_{Ax} = 5.4$ and $v_{Bx} = -3.8$ are the projections of the velocity of the runners into X-axis.

When the paths of the runners cross, their coordinates become equal:

$$x_1 = x_2,\quad x_A + v_{Ax}\cdot t = x_B + v_{Bx}\cdot t,\quad t_0 = \frac{x_B - x_A}{v_{Ax} - v_{Bx}}$$

That is the time, when the runners meet each other.

The distance of the two runners from the flagpole at this time is

$$d = \left|x_1(t_0)\right|,\quad \boxed{d = \left|x_A + v_{Ax}\cdot\frac{x_B - x_A}{v_{Ax} - v_{Bx}}\right|}.$$

Let check the dimension.

$$[d] = km + \frac{km}{h}\cdot\frac{km}{\frac{km}{h}} = km.$$

Let evaluate the quantity.

$$d = \left|-6.8 + 5.4\cdot\frac{4.4 - (-6.8)}{5.4 - (-3.8)}\right| = 0.23(km).$$

Answer: $0.23\,km$.