Question #35699

A radar locates an enemy bomber 400 km away and flying directly toward the capital city at a speed of 600 km per hour. At the same moment, a fighter plane leaves the capital city at a speed of 750 km per hour. When and where will the fighter plane intersect the enemy bomber?

Solution:

Let

$S_0 = 400\ km$

$v_1 = 600\ {}^{km}/_{h}$

$v_2 = 750\ {}^{km}/_{h}$

$S = ?, t_x = ?$

The distance between the bomber and the capital city defined as

$S = S_0 - v_1 t$ were t is the time

The distance between the fighter plan and the capital city defined as

$S = v_2 t$ were t is the time

When the fighter plan intersect the bomber (through time t_x) their distances is equal

$$\boldsymbol{S_0 - v_1 t_x = v_2 t_x}$$

$$\boldsymbol{t_x = \frac{S_0}{v_1 + v_2}}$$

The distance from the city at this time is

$$\boldsymbol{S = t_x v_2}$$

$$\boldsymbol{t_x = \frac{400}{600+750} = 0.3\ h}$$

$$\boldsymbol{S = 0.3 * 750 = 225\ km}$$

Answer: through 0.3 h (or 18 min) at distance 225 km from city.