Answer on Question #44305 – Physics - Mechanics | Kinematics | Dynamics

A police jeep is chasing with velocity 45km/hr,a thief in another jeep moving with velocity 153km/hr.police fires a bullet with muzzel velocity of 180m/s.what is the velocity with which it will strike the car of the thief?

Solution:

$V_P = 45\frac{km}{hr} = 12.5\frac{m}{s} - \text{velocity of the police jeep;}$

$V_T = 153\frac{km}{hr} = 42.5\frac{m}{s} - \text{velocity of the thief's jeep;}$

$V_B = 180\frac{m}{s} - \text{velocity of the bullet;}$

Now, since bullet is fired from police jeep which is going at V_P therefore, velocity of bullet is

$$U = V_B + V_P = 180\frac{m}{s} + 12.5\frac{m}{s} = 192.5\frac{m}{s}$$

To calculate velocity with which bullet will hit the thief we use concept of relative velocity.

Therefore, we have (Here V_B is velocity of bullet and V_T is velocity of thief)

$$V_{BT} = V_B - V_T$$

$$V_{BT} = 192.5\frac{m}{s} - 42.5\frac{m}{s} = 150\frac{m}{s}$$

Answer: the velocity with which bullet will strike the car of the thief is equal to $150\frac{m}{s}$.