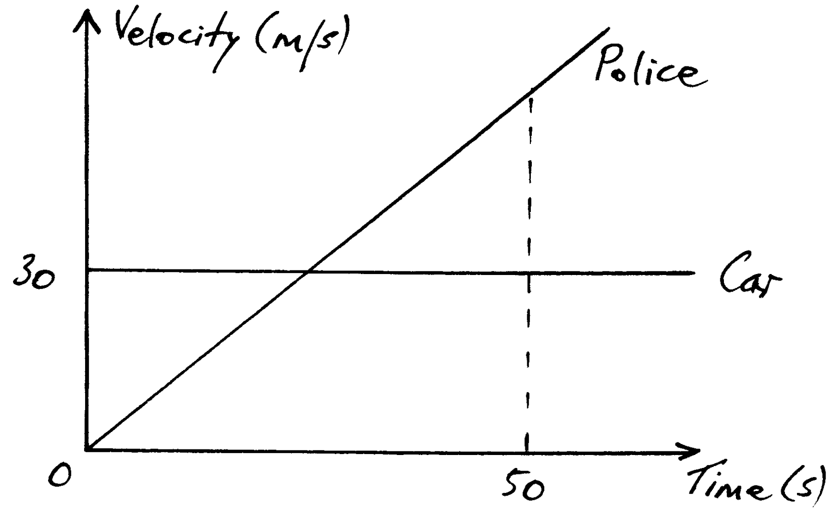
Solution to Example 4 :

$V_c = 30\,ms^{-1}$
$u_p = 0\,ms^{-1}$
$V_p = ?$
$t = 50\,s$, for police to catch car

{ Subscript c = car
Subscript p = police

(a)



(b) For police to catch car, the distance travelled by police must equal distance travelled by car since beginning of the chase.

∴ Area under police car graph = Area under car graph

$$\tfrac{1}{2} \times 50 \times V_p = 30 \times 50$$

$$\therefore V_p = 60\,ms^{-1}$$

∴ Police car reaches $60\,ms^{-1}$ as it catches the car. (WOW – what a police car!)

(c) From graph : $a_p = \dfrac{\Delta V}{\Delta t} = \dfrac{60}{50} = 1.2\,ms^{-2}$.

Acceleration of police car is $1.2\,ms^{-2}$ in direction of motion.