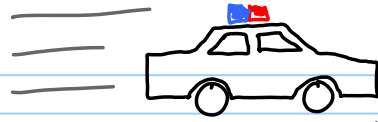A police car is traveling at 52.0 km/h when a speeding car races past. The police car accelerates at 5.24 m/s^2, reaching a final velocity of 108 km/h.

a. How long did it take the police car to reach full speed?

b. How far did it travel in this time?

$V_0 = 52.0 \text{ km/h}$ $V = 108 \text{ km/h}$

a.) $V = 108 \text{ km/h} \div 3.6 = 30.00 \text{ m/s}$ ✓

      $V_0 = 52.0 \text{ km/h} \div 3.6 = 14.44 \text{ m/s}$

      $a = 5.24 \text{ m/s}^2$

      $d =$

      $t =$

$V = V_0 + at$ ✓

$-V_0 \quad -V_0$

$\dfrac{V - V_0}{a} = \dfrac{at}{a}$

$t = \dfrac{V - V_0}{a} = \dfrac{30.00 - 14.44}{5.24}$

$= 2.9686 \text{ s}$

$= \boxed{2.97 \text{ s}}$ ✓

b. $d = V_0 t + \tfrac{1}{2} a t^2$ ✓

     $= (14.44)(2.9686) + \tfrac{1}{2}(5.24)(2.9686)^2$

     $= \boxed{66.0 \text{ m}}$ ✓