# 12 Kinematics of a Particle

## Rectilinear Kinematics

**12 - 1.** A car is traveling at a speed of 8 m/s when the brakes are suddenly applied, causing a constant deceleration 1 m/s$^2$. Determine the time required to stop the car and the distance traveled before stopping.

**Solution**

Since the deceleration is constant, determine the time $t$ using

$$(\overset{+}{\rightarrow}) \ v = v_0 + a_c t$$

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$t = 8$ s                                                                    **Ans.**

Determine the distance traveled using

$$(\overset{+}{\rightarrow}) v^2 = v_0^2 + 2a_c(s - s_0)$$

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$s = 32$ m                                                                **Ans.**

Also, using the time $t$ computed above the following equation can be used to determine the distance.

$$(\overset{+}{\rightarrow}) s = s_0 + v_0 t + \frac{1}{2}a_c t^2$$

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$s = 32$ m                                                                **Ans.**