

**Answer on Question #45815, Physics, Mechanics | Kinematics | Dynamics**

**Question:**

At  $t = 0$ , one toy car is set rolling on a straight track with initial position 14.5 cm, initial velocity  $-3.1$  cm/s, and constant acceleration  $2.60$  cm/s<sup>2</sup>. At the same moment, another toy car is set rolling on an adjacent track with initial position 12.0 cm, initial velocity  $5.70$  cm/s, and constant zero acceleration.

(c) At what time(s), if any, do the cars pass each other? (If there is only one time, enter NA in the second blank. If there are two times, enter the smaller time first. If they never pass, enter NA in both blanks.)

**Answer:**

Coordinate of first car depending on time equals:

$$x_1 = 14.5 - 3.1t + 2.6t^2$$

For second car:

$$x_2 = 12 + 5.7t$$

The cars pass each other if  $x_1 = x_2$ :

$$14.5 - 3.1t + 2.6t^2 = 12 + 5.7t$$

$$2.6t^2 - 8.8t + 2.5 = 0$$

Solutions of this equation are:

$$t_1 = 0.313 \quad t_2 = 3.072$$

Answer: 0.313, 3.072