

Answer on Question #66130-Physics-Mechanics-Relativity

In an arcade video game a spot is programmed to move across the screen to $x=9.00t-0.750t^3$, where x is the distance in cm and t is the time in seconds. When the spot reaches a screen edge, at either $x=0$ or $x=15.0$ cm. t is reset to 0 and spot start moving again according to $x(t)$

- a) at what time after starting is the spot instantaneously at rest.
- b) where does it occur
- c) what is its acceleration when it occurs
- d)i)in what direction is it moving just prior to coming to rest.
- d)ii)just after
- e) when does it first reach an edge of the screen after $t=0$.

Solution

a)

$$v = \frac{dx}{dt} = 9.00 - 3 \cdot 0.750t^2 = 0$$

$$t = 2 \text{ s.}$$

b)

$$x(2) = 9.00(2) - 0.750(2)^3 = 12 \text{ cm.}$$

c)

$$\frac{dv}{dt} = -3 \cdot 2 \cdot 0.750t.$$

$$\frac{dv}{dt}(2) = -3 \cdot 2 \cdot 0.750(2) = -9 \frac{\text{cm}}{\text{s}^2}.$$

d)i) Positive.

ii) Negative.

e)

$$x = 0 = 9.00t - 0.750t^3$$

$$t = 3.46 \text{ s.}$$

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