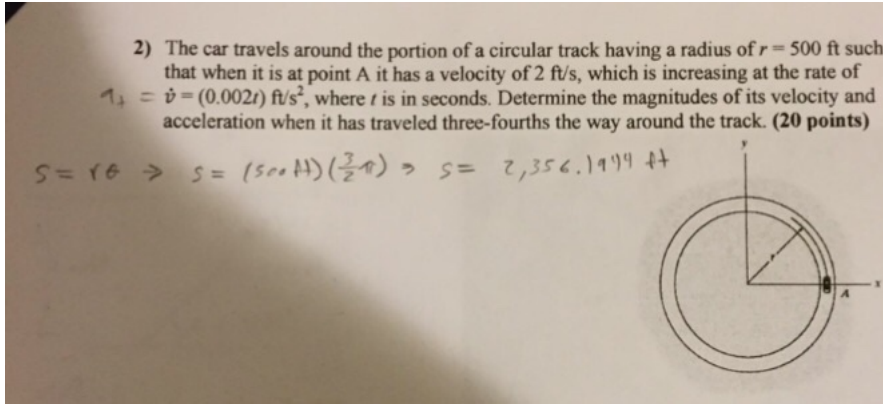


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Velocity at A, $v_0 = 2 \text{ ft/s}$

$$a_t = \dot{v} = (0.002t) \text{ ft/s}^2$$

$$\text{Total distance of track, } = 2\pi r = 2\pi(500) \\ = 1000\pi \text{ ft}$$

The three-fourths travel distance is

$$d = s = \frac{3}{4}(1000\pi) = 750\pi \text{ ft}$$

We know that,

$$s = v_0 t + \frac{1}{2} a t^2$$

given,

$$a_t = 0.002t$$

$$\frac{dv}{dt} = 0.002t$$

$$dv = 0.002t \cdot dt$$

Integrate on both sides

$$\int_2^{v_B} dv = \int_0^t 0.002t \, dt$$

$$(v_B - 2) = \frac{0.002t^2}{2}$$

$$\Rightarrow \boxed{v_B = (2 + 0.001t^2) \text{ ft/s}}$$

$$\text{and } v_B = 2 + 0.001t^2$$

$$\frac{ds}{dt} = 2 + 0.001t^2$$

Integrate on both sides

$$\int_0^{750\pi} ds = \int_0^t (2 + 0.001t^2) \cdot dt$$

$$[s]_0^{750\pi} = 2t + \frac{0.001t^3}{3}$$

$$750\pi = 2t + (3.333 \times 10^{-4}) \cdot t^3$$

$$\dots -4t^3 + 2t - 2356.2 = 0$$



by solving

$$t = 181.51 \text{ sec}$$

at $s = 750\pi$

$$\Rightarrow \text{velocity, } v_B = (2 + 0.001t^2)$$

$$= 2 + (0.001)(181.51)^2$$

$$v_B = 34.95 \text{ ft/sec}$$

acceleration, $a = \dot{v} = 0.002t$

$$= 0.002(181.51)$$

$$\dot{v} = 0.36302 \text{ ft/sec}^2$$

Hence at three-fourths distance,

velocity, $v_B = 34.95 \text{ ft/sec}$

Acceleration, $a = \dot{v} = 0.36302 \text{ ft/sec}^2$

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Q: The car travels around the portion of a circular track having a radius of $r = 400$ ft such that when it is at point A it has a velocity of 5 ft/s, which is increasing at the rate of $v = (0.004t)$ ft/s², where t is in seconds. Determine the magnitude of the acceleration when it has traveled three-fourths the way around the track. Determine the magnitude of the velocity when it has...

A: [See answer](#) 100% (3 ratings)

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A: [See answer](#) 100% (7 ratings)

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A: [See answer](#)

Q: Please help!

A: [See answer](#) 100% (3 ratings)

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