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Tecnológico de Monterrey Preparatoria

Activity 4.4: Contextual Situations. Applications of the Definite Integral

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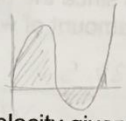
Using your knowledge on Calculus solve the following

1. A particle moves along a path with a velocity given by $v(t)=t^3-8t^2+15t$ in meters/second.

a) Find the displacement of the particle on the first 6 seconds 18 m

b) Find the total distance traveled by the particle on the first six seconds 28.667 m

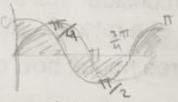


$\int_0^3 + \int_3^5 + \int_5^6 = 15.75 + 5.33 + 7.583$

2. An object moves on a linear path with a velocity given by $v(t)=Cos(2t)$ in meters/second

a) Find the displacement of the object from $t=0$ until $t=\pi$ seconds 0 m

b) Find the total distance traveled by the object from $t=0$ until $t=\pi$ seconds 2 m



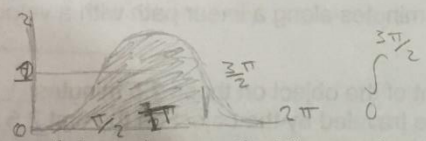
$\int_0^{\pi/4} + \int_{\pi/4}^{3\pi/4} + \int_{3\pi/4}^{\pi} = .5 + 1 + .5$

3. The acceleration of a particle, traveling along a linear path, is given by $a(t)=Sin(t)$ in meters/second^2, the particle starts from rest.

a) Find the equation that gives the velocity of the particle $v(t) = -\cos(t) + 1$

b) Find the displacement of the particle on the first $3\pi/2$ seconds 5.712 m

c) Find the total distance traveled by the particle on the first $3\pi/2$ seconds 5.712 m



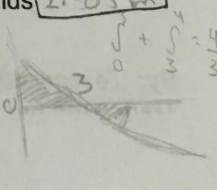
$\int_0^{3\pi/2}$

4. An object is moving along a path in such a way that the acceleration of the object is given by $a(t)=-\frac{1}{\sqrt{t+1}}$ in meters/second^2

a) Find the equation that gives the velocity of the object, the initial velocity of the object was 2 meters/second $v(t) = -2\sqrt{t+1} + 4$

b) Find the displacement of the object from $t=0$ until $t=4$ seconds 2.48 m

c) Find the total distance traveled by the object from $t=0$ until $t=4$ seconds 2.889 m



$\int_0^3 + \int_3^4 = \frac{4}{3} + 1$

***By:** Teachers that Designed the Course*

***Translated by:** Arq. Mónica M. Paniagua*

I think that it was useful to see how we can use integrals in a real world context.