324 - 576 + 270 = 18

15/17

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

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

$$x(t) = \int_0^6 t^3 - 8t^2 + 15t = \frac{t^4}{4} - \frac{8t^3}{3} + \frac{15t^2}{2} = 0$$

$= 18m$

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

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

$$x(t) = \int_0^{\pi} \cos(2t) = -\frac{1}{2}\sin(2t) =$$

0m

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

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

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

$-\cos(3\pi/2) = 0$

$1 + 2 = 3$

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

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

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

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