

Lab Worksheet for October 21, 2021

Practice with applications of definite integrals and Average Value .

1. What is the average value of $f(x) = x^3 - 9x$ on the interval $[-1,3]$?

2. What is the average value of $f(x) = \sqrt{x}$ on the interval $[5,12]$?

3. What is the average value of $f(x) = 14 - 6x^2$ on the interval $[-1,3]$?

4. What is the average value of $f(x) = \cos(x)$ on the interval $[0,2\pi]$?

5. A particle moves in a straight line with a velocity $v(t) = 6t - 20$ meters per second, where t is time in seconds. At $t = 1$, the particle's distance from the starting point was 9 meters in the positive direction. What is the particle's position at $t = 4$ seconds?

6. Find the area of the region that is enclosed between the curves $y = x^2$ and $y = x + 6$.

7. A spring exerts a force of $F(x) = 5x$ in newtons when stretched x meters beyond its natural length. (As a reminder $\text{Work} = \text{Force} * \text{Displacement}$)

How much work is required to stretch the spring 1.8 m beyond its natural length?