

Total Area vs. Displacement

1. A particle's velocity function is given by $v(t) = 3t^2 - 2t - 1$. If $s(0) = -2$, find:

a. The particle's displacement from $t = 0$ to $t = 3$ sec.

b. The particle's position at $t = 3$ sec.

c. The total distance traveled by the particle from $t = 0$ to $t = 3$ sec.

2. For the function $f(x) = 2x^2 - x - 6$, find:

a. The net area under the curve from $x = -3$ to $x = 0$.

b. The total area under the curve from $x = -3$ to $x = 0$.

c. Find the average value of the function from $x = -3$ to $x = 0$.

3. For $f(x) = (e^{x^2} - 1) - 5$, find:

a. The net area from $x = 0$ to $x = e$

b. The total area from $x = 0$ to $x = e$.

4. A particle's velocity function is given by $v(t) = 6t - 7$. If $s(0) = 5$, find:

a. The particle's displacement from $t = 0$ to $t = 2$ sec.

b. The particle's position at $t = 2$ sec.

c. The total distance traveled by the particle from $t = 0$ to $t = 2$ sec.

d. Find the average velocity of the particle from $t = 0$ to $t = 4$ sec.

e. Find the average acceleration of the particle from $t = 0$ to $t = 4$ sec.