In the above work we showed that $\int_0^4(-32t+128)dt$ = s(4) – s(0) where s(t) is a function such that s'(t) = -32t + 128. We also showed that $\int_2^4(-32t+128)dt$ = s(4) – s(2).

Fundamental Theorem of Calculus

Suppose $f(x)$ is continuous on [a,b]. If F(x) is any antiderivative of $f(x)$, that is F'(x) = $f(x)$, then

$$\int_a^b f(x)dx = F(b) - F(a)$$

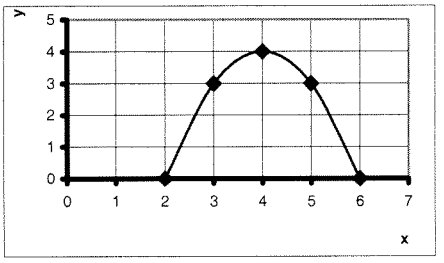
For convenience we write $F(x)\Big|_a^b = F(b) - F(a)$.

3. Evaluate:

a. $\int_2^6(-x^2+8x-12)dx$

b. $\int_0^{10}50e^{0.05t}dt$

4. Find the area of the region in the 1st quadrant between the graph of y = -x² + 8x – 12 and the x-axis. What is the average value of the function over the interval [2, 6]?



5. The rate of sales of an item is given by S'(t) = -3t² + 36t where t is the number of weeks after an advertising campaign has begun. How many items were sold during the third week?