Answer on Question #50588 - Math - Calculus

Question

A rectangle has sides of length x cm and $(2x-4)$ cm and the length x cm at time t seconds is given by $x = 2+3t$, $(t \geq 0)$. Show that the area, A cm^2 , the rectangle, in terms of t is $A = 12t + 18t^2$. Hence find the rate of change of the area at the instant when $t = 2$.

Solution

It is known that the area of rectangle with lengths of sides x cm and $(2x-4)$ cm is

$A = x(2x-4)\ cm^2$.

Since $x(t) = 2+3t$, then

$A(t) = x(t)(2x(t)-4) = (2+3t)(2(2+3t)-4) = (2+3t)(4+6t-4) = (2+3t)6t = 12t+18t^2$.

The rate of changing the area of rectangle is the derivative of *A(t)* with respect to *t*:

$A'(t) = \left(12t+18t^2\right)' = 12+36t$.

Then at moment $t = 2$ it will be $A'(2) = 12+36\cdot 2 = 84\ cm^2/s$.

Answer. $84\ cm^2/s$.