Answer on Question #44888 - Math - Multivariable Calculus

In all of this question assume the sales volume of a new product (in thousands of units) is given by S =AT + 450/√A + T^2 where T is the time (in months) since the product was first introduced and A is the amount (in hundreds of dollars) spent each month on advertising. Assume A, T > 0.

(a) Calculate the partial derivative of S with respect to time. Use that partial derivative to predict the number of months that will elapse before sales volume begins to decrease if the amount allocated to advertising is held fixed at $9, 000 per month.

Solution

$S = AT + \frac{450}{\sqrt{A}} + T^2$,   A is fixed,

$\frac{\partial S}{\partial T} = A + \frac{450}{\sqrt{A}} + 2T$

as soon as $A > 0$, $\frac{dS}{dT} > 0$ for any $T > 0$.

It means that sales volume S will never begin to decrease.