

Exercise 21

A balloon's volume V is given by $V = s^2 + 2s + 3$ cm³, where s is the ambient temperature in °C. The ambient temperature s at time t minutes is given by $s = 2t - 3$ °C. Write the balloon's volume V as a function of time t .

Solution

The balloon's volume as a function of time is

$$\begin{aligned}V(s) &= s^2 + 2s + 3 \\V(s(t)) &= (2t - 3)^2 + 2(2t - 3) + 3 \\&= (4t^2 - 12t + 9) + (4t - 6) + 3 \\&= 4t^2 - 8t + 6.\end{aligned}$$