

You *MAY* use a calculator.

There is no snow on Janet's driveway when snow begins to fall at midnight. From midnight to 9 a.m., snow accumulates on the driveway at a rate modeled by $f(t) = 7te^{\cos t}$ cubic feet per hour, where t is measured in hours since midnight. Janet starts removing snow at 6 a.m. ($t = 6$). The rate $g(t)$, in cubic feet per hour, at which Janet removes snow from the driveway at time t hours after midnight is modeled by

$$g(t) = \begin{cases} 0 & \text{if } 0 \leq t < 6 \\ 125 & \text{if } 6 \leq t < 7 \\ 108 & \text{if } 7 \leq t \leq 9 \end{cases}$$

- (a) How many cubic feet of snow have accumulated on the driveway by 6 a.m.?

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- (b) Find the rate of change of the volume of snow on the driveway at 8 a.m.

(c) Let $h(t)$ represent the total amount of snow, in cubic feet, that Janet has removed from the driveway at time t hours after midnight. Express h as a piecewise-defined function with domain $0 \leq t \leq 9$.

(d) How many cubic feet of snow are on the driveway at 9 a.m.?