2007 F=ma Exam: Problem 6

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Recall velocity is defined by

$$v = \frac{dx}{dt}$$

so

$$x = x_0 + \int_0^t v \, dt'$$

We have $v = 5t^2$ and $x_0 = 0$:

$$x = 0 + \int_0^t 5t'^2 \, dt'$$

Hence,

$$x = \frac{5t^3}{3}$$

so the answer is $\boxed{\text{B}}$.