SM 223$_{\text{TSM}}$ Quiz #6 28 Sep 2010 Last Name SOLUTIONS Section ○4041 ○5041 ○6041

Time Limit: 3 minutes

Instructions: Open book. Open notes. Calculator allowed.

Instructions for all quizzes: **Do not discuss any aspect of this quiz with other midshipmen until after 6th period.**

Print your last name above. Also, fill in the bubble for your section.

Fill the bubble for the correct answer. Also, write your answers in any blanks provided.

Your work will not be graded unless requested.

Suppose that acceleration of a particle at time t is $\mathbf{a}(t) = \langle 4t,\, 6t^2 \rangle$ and the velocity satisfies $\mathbf{v}(1) = \langle 2, 8 \rangle$. Find $\mathbf{v}(2)$.

Put your answer in the indicated space and show your work!

Answer: $\mathbf{v}(2) = \langle 8,\, 22 \rangle$

Reason: $\mathbf{v}(t) = \int \mathbf{a}(t)\, dt = \int \langle 4t,\, 6t^2 \rangle\, dt = \langle 2t^2, 2t^3 \rangle + \mathbf{C}$.
The initial condition gives us

$$\langle 2, 8 \rangle = \mathbf{v}(1) = \langle 2 \cdot 1^2,\, 2 \cdot 1^3 \rangle + \mathbf{C} = \langle 2, 2 \rangle + \mathbf{C}.$$

So $\langle 0,\, 6 \rangle = \mathbf{C}$.
Thus $\mathbf{v}(t) = \langle 2t^2,\, 2t^3 \rangle + \langle 0, 6 \rangle$, and $\mathbf{v}(2) = \langle 2 \cdot 2^2, 2 \cdot 2^3 \rangle + \langle 0, 6 \rangle = \langle 8, 22 \rangle$