WebAssign
Hw 8 (13.4): Motion in Space, Vel. and Acc. (Homework)

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MA 261 Fall 2012, section 121, Fall 2012
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Current Score : 20 / 20 **Due :** Tuesday, September 11 2012 11:00 PM EDT

1. 2.85/2.85 points | Previous Answers SCalcET7 13.4.001.

The table gives coordinates of a particle moving through space along a smooth curve.

t	*x*	*y*	*z*
0	2.8	9.1	3.8
0.5	3.7	7.1	3.4
1.0	4.9	6.2	3.2
1.5	5.3	6.4	2.8
2.0	7.7	7.6	2.5

(a) Find the average velocities over the time intervals [0, 1], [0.5, 1], [1, 2], and [1, 1.5]. (Round your answers to the nearest tenth.)

[0, 1]: $\mathbf{v}_{ave}$ =

[0.5, 1]: $\mathbf{v}_{ave}$ =

[1, 2]: $\mathbf{v}_{ave}$ =

[1, 1.5]: $\mathbf{v}_{ave}$ =

(b) Estimate the velocity and speed of the particle at t = 1. (Use the time intervals [0.5, 1] and [1, 1.5] to calculate your answer. Round the speed to two decimal places.)

$\mathbf{v}(1)$ =

$|\mathbf{v}(1)|$ = 1.847

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2. 2.85/2.85 points | Previous Answers SCalcET7 13.4.010.

Find the velocity, acceleration, and speed of a particle with the given position function.

$\mathbf{r}(t) = \langle 7\cos t,\ 5t,\ 7\sin t \rangle$

$\mathbf{v}(t)$ =

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$\mathbf{a}(t)$ =

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$|\mathbf{v}(t)|$ =

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3. 2.85/2.85 points | Previous Answers SCalcET7 13.4.011.MI.

Find the velocity, acceleration, and speed of a particle with the given position function.

$$\mathbf{r}(t) = 8\sqrt{2}\,t\,\mathbf{i} + e^{8t}\mathbf{j} + e^{-8t}\mathbf{k}$$

$\mathbf{v}(t)$ =

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$\mathbf{a}(t)$ =

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$|\mathbf{v}(t)|$ =

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4. 2.85/2.85 points | Previous Answers SCalcET7 13.4.012.

Find the velocity, acceleration, and speed of a particle with the given position function.

$\mathbf{r}(t) = t^2\mathbf{i} + 3t\mathbf{j} + 4 \ln t \, \mathbf{k}$

(a) velocity

(b) acceleration

(c) speed

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5. 2.85/2.85 points | Previous Answers SCalcET7 13.4.015.MI.

Find the velocity and position vectors of a particle that has the given acceleration and the given initial velocity and position.

$\mathbf{a}(t) = 5\mathbf{i} + 6\mathbf{j}, \quad \mathbf{v}(0) = \mathbf{k}, \quad \mathbf{r}(0) = \mathbf{i}$

$\mathbf{v}(t) =$

$\mathbf{r}(t) =$

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6. 2.85/2.85 points | Previous Answers SCalcET7 13.4.016.

Find the velocity and position vectors of a particle that has the given acceleration and the given initial velocity and position.

$$\mathbf{a}(t) = 2\mathbf{i} + 6t\mathbf{j} + 12t^2\mathbf{k}, \quad \mathbf{v}(0) = \mathbf{i}, \quad \mathbf{r}(0) = 7\mathbf{j} - 5\mathbf{k}$$

$\mathbf{v}(t)$ =

$\mathbf{r}(t)$ =

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7. 2.9/2.9 points | Previous Answers SCalcET7 13.4.019.MI.

The position function of a particle is given by $\mathbf{r}(t) = \langle t^2, 7t, t^2 - 16t \rangle$. When is the speed a minimum?

t = 4

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