Chapter 10 Final answers are circled! :) ☺

① My birthday

12/08/2000

② $\vec{r} = \langle 8t^{12}, \sin(t/12), 8/e^t \rangle$

③ $\vec{v}(t) = \vec{r}\,'(t)$

$\vec{r}\,'(t) = \langle 12(8)t^{11}, [\cos(t/12)][1/12], -8e^{-t} \rangle$

④ $\vec{a}(t) = \vec{r}\,''(t)$

$\vec{r}\,''(t) = \langle 96(11)t^{10}, [\cos(t/12)]/12, -8e^{-t} \rangle$

$\frac{d}{dt}\left[\frac{\cos(t/12)}{12}\right] = \frac{1}{12}\frac{d}{dt}\left[\cos(t/12)\right] = \frac{1}{12}\left[-\sin(t/12)\cdot\frac{1}{12}\right] = \boxed{\frac{-\sin(t/12)}{144}}$

$\frac{d}{dt}\left[-8e^{-t}\right] = -8\frac{d}{dt}\left[e^{-t}\right] = -8\left[-e^{-t}\right] = \boxed{8e^{-t}}$

$\vec{r}\,''(t) = \langle 1056t^{10}, \frac{-\sin(t/12)}{144}, 8e^{-t} \rangle$

⑤ $t = |m-d| = |12-8| = 4 = t$

$\vec{r}\,'(4) = \langle 96(4)^{11}, \frac{\cos(4/12)}{12}, -8e^{-4} \rangle$

$\vec{r}\,'(4) = \langle 4026531840, \approx 0.787464, \approx -0.1465251 \rangle$

$\vec{r}\,''(4) = \langle 1056(4)^{10}, \frac{-\sin(4/12)}{144}, 8e^{-4} \rangle$

$\vec{r}\,''(4) = \langle 1107296256, \approx -0.0022722, \approx 0.1465251 \rangle$