Exam 2 - Ch. 13 Review Overheads

Details:

- 1 short-answer/multiple choice problem, several parts (no partial credit).
- 2 questions, 2-3 parts each, where you will upload handwritten work. You MUST show work on handwritten problems.
- A basic scientific calculator allowed (no graphing or calculus calculator). Allowed one **hand-written** 8.5 by 11 inch page of notes (double-sided)
- Covers 13.1-13.4. You should know all the facts and concepts covered in lecture and in homework for those sections.
- You have 60 minutes to complete the exam. Exam opens at 12:00pm (noon) and closes at 3pm (start before 2pm to get your full 60 minutes).
- You must SUBMIT each of your final answer within the exam before time runs out.
- Please upload handwritten work on the exam itself if time allows. If you run out of time or have technical problems uploading (or want to make sure your files are uploaded), then upload them in the dropbox assignment immediately after your exam.
- Your handwritten work must be a pdf, jpg, png or gif file (NO HEIC files).

Ch. 13 - 3D Curves:

1. $\mathbf{r}'(t) = \langle \frac{dx}{dt}, \frac{dy}{dt}, \frac{dz}{dt} \rangle = \mathbf{v}(t) =$ velocity vector.
2. $|\mathbf{r}'(t)| = |\mathbf{v}(t)| =$ speed
3. $\mathbf{r}''(t) = \langle \frac{d^2x}{dt^2}, \frac{d^2y}{dt^2}, \frac{d^2z}{dt^2} \rangle = \mathbf{a}(t) =$ accel. vector.
4. $\displaystyle\int \mathbf{r}(t)\,dt = \left\langle \int x(t)dt, \int y(t)dt, \int z(t)dt \right\rangle.$
5. $\mathbf{T}(t) = \frac{1}{|\mathbf{r}'(t)|}\mathbf{r}'(t).$
6. $\mathbf{N}(t) = \frac{1}{|\mathbf{T}'(t)|}\mathbf{T}'(t) =$ principal unit normal
7. $s =$ Arc Length $= \int_a^b \sqrt{(x'(t))^2 + (y'(t))^2 + (z'(t))^2}\,dt.$
8. $\kappa(t) = \left|\frac{d\mathbf{T}}{ds}\right| = \frac{|\mathbf{r}'(t)\times\mathbf{r}''(t)|}{|\mathbf{r}'(t)|^3}.$
9. For a function $y = f(x)$ in 2D, the curvature formula simplifies to $\kappa(x) = \frac{|f''(x)|}{(1+(f'(x))^2)^{3/2}}.$
10. $a_T = \frac{\mathbf{r}'(t)\cdot\mathbf{r}''(t)}{|\mathbf{r}'(t)|}$
11. $a_N = \frac{|\mathbf{r}'(t)\times\mathbf{r}''(t)|}{|\mathbf{r}'(t)|}$