MAT 133 Calculus II

2021 Spring 1

Exam 1 Information and Review (all times Grinnell Time)

The exam is Thursday, February 11. The exam will cover the content in 11.1 & 13.1-13.5.

You need to be on Zoom by 10:00 AM that day and can leave Zoom whenever you are done. I will be on by 9:45 AM.

You can mute and turn off your video for Zoom during the exam. If there is a typo or clarification during the exam, I will say it out loud on Zoom and type it in chat, so check chat occasionally. If you have a question during the exam, you can type it to me privately in chat and I will try to respond that way. If we need to chat briefly, we can do so in a Breakout Session.

Besides pencil and paper (or a tablet if you write your homeworks on one) you may only use the textbook (physical version or pdf) and a basic scientific calculator, not notes, nor other webpages, nor friends, nor graphing calculators.

You will download the exam questions from Gradescope just like on the Quizzes. They will release at 9:58 AM.

You will write your solutions on your own paper. Please write as neatly as you reasonably can and let me know clearly which problem is which. You should also include scratch work you want me to grade but, again, clearly mark your solutions. You will have to scan the file somehow (see the syllabus for suggestions) and be finished by 11:15 AM. There is a 5 minute grace period to deal with technology, but you MUST email me by 11:15 AM if you have issues to let me know you need the extra minutes.

Here's what the top of the exam will say: Please read all the problem instructions carefully. Show your work. **No work = No points.** Problems with no justification will get no credit. You may use the book but no notes nor worked problems nor online resources nor graphing calculators. Leave fractions or roots as is in your answer.

If you run into any technical issues during the exam, email me right away.

Book Practice Problems

- pg. 706-707 **Exercises: 1-6**
- pg. 848 **Concept Check: 1-7, 9, 11, 13-16**
- pg. 849-850 **Exercises**: **1-7, 12, 15-21, 24a, 25, 26ab**

Suggestions

- Work lots and lots of problems, especially those on material you don't understand as well.
- When possible, ask yourself WHY you are solving a problem a certain way or WHY the result is true.
- Do not look at solutions unless you are desperate.
- Check your work!!

Sample Problems

These are just a few extra problems for you to practice with. It is possible that the difficulty level of these problems will not perfectly match the exam and the number of problems will not be the same necessarily (i.e. this is not a "practice exam").

1. (a) Sketch the curve defined by the parametric equations $x = 1 + t^{-1}$ and $y = t^2$. Indicate with an arrow the direction which the curve is traced as t increases.
(b) Eliminate the parameter in the equations from (a) to find a Cartesian equation of the curve.

2. Given the vectors $\vec{u} = \langle 1, -3, 2 \rangle$ and $\vec{v} = \langle -2, 1, 5 \rangle$ and $\vec{w} = \langle 3, 2, 2 \rangle$, compute
   (a) $\vec{u} + \vec{v}$
   (b) $\vec{u} \bullet \vec{v}$
   (c) $\vec{u} \times \vec{w}$
   (d) Which direction is the vector $\vec{u} \times \vec{w}$ pointing?

3. (a) Find a vector in the direction of $\vec{u} = \langle 4, 0, -3 \rangle$ but with magnitude 7.
   (b) Find a vector which is orthogonal to $\vec{u}$.

4. Where does the line $\vec{r}(t) = \langle 2, 1, 4 \rangle + \langle -1, -5, 6 \rangle t$ cross the xy-plane?

5. (a) Find vector and scalar equations of the plane through the point (0,1,4) and with normal vector $\langle 4, -3, -5 \rangle$.
(b) Find vector and scalar equations of the plane through the points (-3,1,1), (5, 2, -1) , and (1,7,-2).

6. Two particles travel along the lines given by $\vec{r_1}(t) = \langle 3t - 1, 4t + 2, t - 2 \rangle$ and $\vec{r_2}(t) = \langle t - 2, 4t - 4, -t \rangle$.
   (a) Do the particles collide? If so, when?
   (b) Do their paths intersect? If so, where?