

Math 251
Pretest
Extra Credit!

Instructions: These are review problems. You'll need to look some things up in your textbook. Write out your work and answers neatly in dark ink. Put your name on each page. Scan or photograph putting all images in one PDF document if you can then upload into D2L. You can also turn in your work at my office, 385 Neckers, if you wish. (Wear a mask. Wash your hands.) Turn in by 5 pm Sunday, August 23. But do not wait until Sunday to start!

1. Compute the following derivatives.

a. $(e^{x^2})'''$ b. $(\tan(3 \sin x))''$ c. $(\cos^3(e^{4x}))''$

2. Let $y = xe^{-x}$. Graph this function. Find the coordinates of its maximum and inflection points.

3. Compute the following integrals.

a. $\int x^2 e^x dx$. b. $\int_0^\pi \sin^2 x dx$ c. $\int_0^{2\pi} \cos^3 x dx$ d. $\int_{-7}^7 \sin x^7 dx$ e. $\int_{-\infty}^{\infty} \frac{1}{x^2+1} dx$

4. Graph the circle $x^2 + 2x + y^2 = 2$. Find area enclosed.

5. Graph the hyperbola $x^2 - y^2 = 1$. Identify the two oblique asymptotes.

6. Using polar coordinates graph $r = 1 + \cos \theta$ and find the area enclosed.

7. A triangle has one angle of 50° with the adjacent sides having lengths of 7 and 10. Find the other two angles and the length of the third side. Hint: Review trig identities.

8. Consider the parametric equations $x(t) = e^t$ and $y(t) = e^{2t}$ for $t \geq 0$. Plot the curve and describe the motion.

9. Find parametric equations for a line segment in the plane starting at (1,2) and ending at (3,1) as $0 \leq t \leq 1$.

10. Plot the ellipse given by $x^2/9 + y^2/4 = 1$. Then find parametric equations for this ellipse with parameter $0 \leq t \leq 2\pi$ such that $x(0) = 3$, $y(0) = 0$ and the motion is counterclockwise. Repeat, but this time with $x(0) = 0$, $y(0) = -2$ and the motion is clockwise. (Ask if you need help.)