Math 112 EXAM II, October 23, 2019

Read each problem carefully. Show all your work for each problem! No Calculators!

1. (10) Evaluate the following integrals:

$$(a)\ \int \cot(x)\sin(x)\,dx; \qquad (b)\ \int \frac{\ln x}{x^2}\,dx.$$

2. (16) Evaluate the following integrals:

$$(a)\ \int \tan^4(\theta)\sec^4(\theta)\,d\theta; \qquad (b)\ \int xe^{x^2+1}\,dx.$$

3. (10) Determine if the following integral converges, and indicate which test you are using. (Do NOT evaluate the integral)

$$\int_0^\infty \frac{1+e^{-x}}{1+x^2}\,dx.$$

4. (10) Estimate the following integral using the trapezoidal rule with $n = 4$ steps:

$$\int_{-1}^{1} (t^3+1)\,dx.$$

5. (12) Evaluate the following *improper* integrals:

$$(a)\ \int_{-4}^{4} \frac{1}{(x+4)^{2/3}}\,dx; \qquad (b)\ \int_0^\infty xe^{-2x}\,dx.$$

6. (16) Evaluate the following integrals:

$$(a)\ \int \frac{x}{x^2+4x+5}\,dx; \qquad (b)\ \int \frac{e^x}{\sqrt{1-e^{2x}}}\,dx.$$

7. (16) Evaluate the following integrals:

$$(a)\ \int \frac{x+4}{x^3+4x}\,dx; \qquad (b)\ \int \frac{\cos^3 x}{\sqrt{\sin x}}\,dx.$$ (Hint: begin with an appropriate substitution)

8. (10) Evaluate the following integral:

$$\int \sqrt{7-6x-x^2}\,dx.$$