Math 10A with Professor Stankova
Worksheet, Discussion #21; Friday, 10/13/2017
GSI name: Roy Zhao

True/False

1. True False For $f(x)$ continuous on $[a, b]$, the function $F(x) = \int_a^x f(u)du$ is the unique anti-derivative of f on $[a, b]$ satisfying $F(a) = 0$.
2. True False If $f(x)$ is continuous on $[a, b]$, then $F(x) = \int_a^x f(u)du$ is continuous on (a, b).
3. True False We can use the addition differentiation law to prove the addition integration law for indefinite integrals ($\int(f + g) = (\int f) + (\int g)$).

Integration by Parts

Examples

4. True False Integration by parts will automatically give the antiderivative of a function.
5. Find $\int \arctan(x)dx$.
6. Find $\int \sin(x)\cos(x)dx$.
7. Integrate $\int 2x^3\cos(x^2)dx$.

Problems

8. Integrate $\int x\ln x dx$.
9. Integrate $\int \frac{\ln x}{x^5}dx$.
10. Integrate $\int 2x\arctan(x)dx$.
11. Integrate $\int (\ln x)^2 dx$.

12. Integrate $\int x(\sin x + \cos x)dx$.

13. Integrate $\int \frac{\ln \sqrt{x}}{\sqrt{x}}dx$.

Numerical Integration

14. True False For calculating the error bound when using left endpoint method when approximating the integral of f on the interval $[a, b]$, we use $K_1 = f'(a)$.

15. True False The error for an integral approximation can be negative.

16. True False The error bound gives us what the exact error of using the different approximation techniques are.

17. True False The error bounds aren't helpful because they don't give us the exact error.