Basic Integrals, Math 221 Do as many as you can!

1. Evaluate the integral $\int 2xe^{x^2}\ dx$.

2. Evaluate the integral $\int 15x^2\sqrt{2x^3-12}\ dx$.

3. Evaluate the integral $\int \frac{1}{x\ln x}\ dx$.

4. Evaluate the integral $\int_0^{\pi/2} \sin x\cos^5 x\ dx$.

5. Evaluate the integral $\int_0^{\pi/4} \sec^2 x\tan^2 x\ dx$.

6. Evaluate the integral $\int_0^{\pi/4} \sec^5 x\tan x\ dx$.

7. Evaluate the integral $\int x^5\sqrt{1+x^3}\,dx$.

8. Evaluate the integral $\int \frac{10x}{5x^2-8}\,dx$.

9. Evaluate the integral $\int \frac{1}{2x+3}\,dx$.

10. Evaluate the integral $\int_0^1 \frac{x+1}{x^2+1}\,dx$.

11. Evaluate the integral $\int \frac{e^x}{e^{2x}+1}\,dx$.

12. Evaluate the integral $\int e^{x+e^x}\,dx$.

13. Find the area of the finite region bounded by the curves $y = x^2$ and $y = x^3$.

14. Find the area of the finite region bounded by the curves $y = \sqrt{x}$ and $y = \dfrac{x}{2}$.

15. Find the area underneath $y = x^2 + 2$, above $y = -x$, between $x = 2$ and $x = 3$.

16. Find the area underneath the curve $y = x^4 - 5x^2 + 4$ that lies below the x-axis.

17. Find the area of the finite region bounded by the parabola $y^2 = x$ and the line $x + y = 6$.

18. Find the finite area bounded between $y = x^3 - 3x$ and the x-axis.

19. Find the area above $y = |x|$ and below $y = 4$.

20. Find the area of the finite region between the graphs of $y = |x - 2|$ and $y = \sqrt{x}$.

21. Find $\dfrac{dF}{dx}$ when $F(x) = \displaystyle\int_0^x \sin(u^2)\, du$.

22. Find $\dfrac{dF}{dx}$ when $F(x) = \displaystyle\int_0^{x^2} t\ dt$.

23. Find $\dfrac{dF}{dx}$ when $F(x) = \displaystyle\int_{x^3}^{x^4} e^{\sin(t)}\, dt$.

24. Find $\dfrac{dF}{dx}$ when $F(x) = \displaystyle\int_{-x}^{x} \frac{1}{2 + \cos(t)}\, dt$.