You do not have to hand in these problems. However, I give you the following three motivations to work on them: (1) your integration skills will improve; (2) I will put at least two of these problems on the next exam; and (3) the first person to solve *all* of these problems correctly and give them to me will win a prize!

1. $\displaystyle\int \frac{\ln 2x}{x^2}\,dx$

2. $\displaystyle\int x\sec x\tan x\,dx$

3. $\displaystyle\int \cot^6 x\,dx$

4. $\displaystyle\int \csc^4 x\cot^4 x\,dx$

5. $\displaystyle\int \cos^7 x\,dx$

6. $\displaystyle\int \sin(\ln x)\,dx$

7. $\displaystyle\int \frac{\sin^3 x}{\sqrt{\cos x}}\,dx$

8. $\displaystyle\int \tan^3 x\sec^3 x\,dx$

9. $\displaystyle\int \tan x\,\ln(\cos x)\,dx$

10. $\displaystyle\int_1^3 \frac{e^{\frac{1}{x}}}{x^2}\,dx$

11. $\displaystyle\int x(x+5)^{\frac{7}{2}}\,dx$

12. $\displaystyle\int_0^{\frac{\pi}{2}} \frac{x^2}{(1-x^2)^{\frac{3}{2}}}\,dx$

13. $\displaystyle\int (e^{3\ln x})^2\,dx$

14. $\displaystyle\int \frac{1}{4+4x^2+x^4}\,dx$

15. $\displaystyle\int x^3\sin x\,dx$

16. $\displaystyle\int_0^1 \ln(1+x^2)\,dx$

17. $\displaystyle\int \frac{\sqrt{x}}{1-x\sqrt{x}}\,dx$

18. $\displaystyle\int \sin^4 2x\,dx$

19. $\displaystyle\int (\ln x)^3\,dx$

20. $\displaystyle\int (x\ln x)^{-1}\,dx$

21. $\displaystyle\int \csc 3x\,dx$

22. $\displaystyle\int x^3\cos x^2\,dx$

23. $\displaystyle\int \sin^2 x\cos^2 x\,dx$

24. $\displaystyle\int \sin^{-1} x\,dx$

25. $\displaystyle\int \frac{\arccos x}{\sqrt{1-x^2}}\,dx$

26. $\displaystyle\int \frac{3x^3-2}{x^2+4}\,dx$

27. $\displaystyle\int 2\pi x(8-x^{\frac{3}{2}})\,dx$

28. $\displaystyle\int_0^{\frac{\pi}{2}} \sin^2 x\cos^5 x\,dx$

29. $\displaystyle\int e^x\cos 2x\,dx$

30. $\displaystyle\int \ln\left(\frac{x^3}{2x+1}\right)\,dx$

31. $\displaystyle\int \frac{\sqrt{1-x^2}}{x^4}\,dx$

32. $\displaystyle\int \frac{x^2+3x+7}{\sqrt{x}}\,dx$

33. $\displaystyle\int (\sin x+e^x)^2\,dx$