Get Your Integral On

Often, the most difficult part of integration techniques is knowing which technique to use. Below are a wide assortment of integrals. Some are simple, some are difficult. All use the techniques we have learned, and all were taken from previous Calculus II exams at Cornell. One or two are improper; so keep any eye out. The best way to become great at integrating is to practice, and to not get discouraged when your first idea doesn't work. Check your answers with your teammates, and just keep integrating!

1) $\int_1^e \frac{\sqrt{ln(x)}}{x}\,dx$

2) $\int \frac{dx}{\sqrt{9-x^2}}$

3) $\int xcos^3(x)\,dx$

4) $\int \frac{ln(x)}{x^2}\,dx$

5) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx$

6) $\int \sin^3(x) + \sin(x)cos^2(x)\,dx$

7) $\int_{-1}^0 \frac{x^3+5x^2+12x+19}{x^2+4x+4}\,dx$

8) $\int \frac{dx}{9-x^2}$

9) $\int \frac{dx}{\sqrt{x}-\sqrt[4]{x}}$

10) $\int \frac{ln(x)}{x^2}\,dx$

11) $\int_1^3 \frac{dx}{x^2-4x+4}$

12) $\int xcos^3x\,dx$

13) $\int e^{\sqrt{x}}\,dx$

14) $\int \frac{dx}{x^3-x}$

15) $\int sin(x)cos(x)e^{cos(2x)}\,dx$

16) $\int \sqrt{4-x^2}\,dx$

17) $\int xln(x^2+1)\,dx$

18) $\int \frac{sin(1/x)}{x^2}\,dx$

19) $\int_0^\pi sin^3(x)cos(x)\,dx$

20) $\int \frac{cos(ln(x))}{x}\,dx$

21) $\int_0^3 te^{-t}\,dx$

22) $\int_0^{\sqrt{2}/2} \frac{x^3}{\sqrt{1-x^2}}\,dx$

23) $\int \frac{dy}{y(k-y)}$ where k is a constant

24) $\int \frac{x^3}{(1+9x^4)^{3/2}}\,dx$

25) $\int_0^4 \frac{2t}{9+t^2}\,dt$

26) $\int_0^{\pi} cos(3x)cos(3sin(3x))\,dx$

27) $\int \frac{x^2+2}{(x^2+1)(x-1)}dx$

If you want more integrals to practice with, see page 509-510 of your textbook; Assorted Integrations, and Additional and Advanced Exercises

Solutions to this worksheet and further guidelines for choosing an integration technique will be discussed before Prelim 2. As you work, can you notice any characteristics of an integrand that points you toward one technique or another? Jot down ideas for later discussion.