Math 110, Spring 2016
HWK04 due Feb 17

1. Compute these integrals via substitution.

   (a) $\displaystyle\int_0^4 \sqrt{5y+1}\,dy$

   (b) $\displaystyle\int \sqrt{\frac{x^4}{x^3-1}}\,dx$

   (c) $\displaystyle\int_1^{e^{\pi/4}} \frac{4\,dt}{t(1+(\ln t)^2)}$

2. Compute these integrals via integration by parts.

   (a) $\displaystyle\int_0^{\ln 2} t^2 e^{4t}\,dt$

   (b) $\displaystyle\int \arcsin y\,dy$

   (c) $\displaystyle\int_0^1 x^3 e^{x^2/2}\,dx$

3. Compute these integrals via any means you can.

(a) $\displaystyle\int \frac{dx}{x(\ln x)^3}$

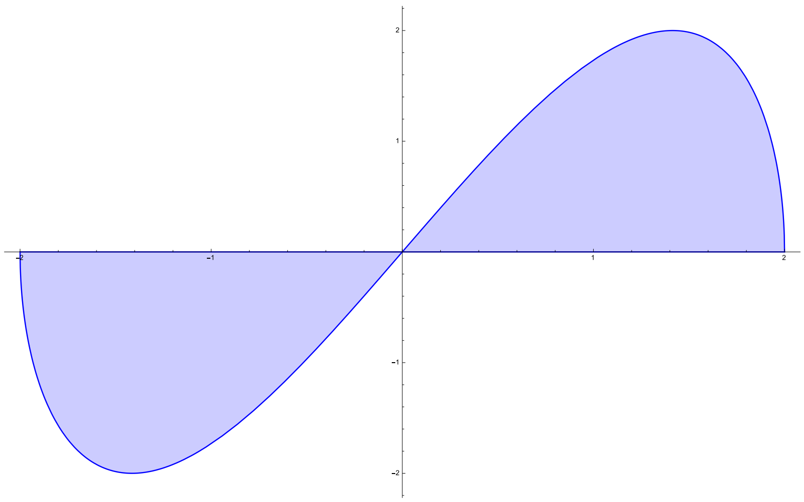
(b) $\displaystyle\int \frac{\ln x}{x}\,dx$

(c) $\displaystyle\int e^x \sin(e^x)\,dx$

(d) $\displaystyle\int e^{2x} \sin(x)\,dx$

(e) $\displaystyle\int \ln(x + x^2)\,dx$

4. Find the area of the shaded region. The curved boundary is $y = x\sqrt{4-x^2}$ (problem 5.6 #47 in the book).



5. The figure shows triangle AOC inscribed in the region cut from the parabola $y = x^2$ by the horizontal line $y = a^2$. Find the limit as a approaches zero of the ratio of the area of the triangle to the area of the parabolic region (problem 5.6 #107 in the book).