# Exam 1 Practice Solutions

1. Evaluate each of the following integrals.
   (a) $\frac{1}{2}\ln|x^2-4|+C$
   (b) $\frac{1}{4}\ln|x-2|-\frac{1}{4}\ln|x+2|+C$
   (c) $\frac{1}{4}+\frac{1}{4}e^2$
   (d) $2\sin(\sqrt{x})$
2. Consider the integral
$$I=\int_0^1 \sin(x^2)\,dx.$$
   (a) You can use $K_1=2$. Then $I-L_5\le 1/5=0.2$.
   (b) $n\ge 200$
3. $e^{x^2}$ is concave up on $[0,3]$, so $M_n$ underestimates $I$.
4. Consider the region $R$ in the plane bounded by the graphs of $y=x$ and $y=x^2$.
   (a) $1/6$
   (b) $2\pi/15$
   (c) $\pi/6$
   (d) $\int_0^1\sqrt{1+1^2}\,dx+\int_0^1\sqrt{1+(2x)^2}\,dx$
5. $\frac{-1}{\pi^2}$
6. $3\pi/40$