- Please put your name, ID number, and section number (or time) on your blue book.
- The exam is CLOSED BOOK, but you may use a page of notes.
- Calculators are NOT allowed.
- You need not simplify answers. For example, if $3 \ln 2-\ln 6$ is your answer, you need not simplify it to $\ln (4 / 3)$.
- You must show your work to receive credit.

1. ( 80 pts .) Evaluate the following integrals. Remember to show your work!
(a) $\int(\sin x)(\cos (\cos x)) d x$
(b) $\int \frac{t^{2}}{\sqrt{1-t^{2}}} d t$
(c) $\int \sin \left(t^{1 / 2}\right) d t$
(d) $\int \frac{1+e^{x}}{1-e^{x}} d x$
2. (20 pts.) Let $f(x)=e^{-x^{2} / 2}$ and let $I=\int_{0}^{1} f(x) d x$.

It can be shown that $f^{\prime}(x)<0$ for $x>0$ and $f^{\prime \prime}(x)<0$ for $|x| \leq 1$.
The left, right, Trapezoidal, and Midpoint Rules were used to estimate $I$ and the same number of subintervals were used in each case. Call the estimates $L, R, T$, and $M$, respectively. Order $I, L, M, R$, and $T$ from smallest to largest.

You MUST explain how you obtained your ordering. Simple pictures with some clear words relating to them will suffice.
3. ( 25 pts .) Determine which of the following integrals are divergent and which are not. Evaluate all integrals which are NOT divergent.
(a) $\int_{0}^{1} \frac{2 x}{x^{2}-4 x+3} d x$
(b) $\int_{2}^{4} \frac{2 x}{x^{2}-4 x+3} d x$
(c) $\int_{4}^{6} \frac{2 x}{x^{2}-4 x+3} d x$

Note that $x^{2}-4 x+3=(x-1)(x-3)$.

