Your Name

Good luck:)

- This exam is closed book. You may use one $8.5'' \times 11''$ sheet of handwritten notes (both sides OK). Do not share notes. No photocopied materials are allowed.

- Give your answers in exact form (for example $\dfrac{\pi}{3}$ or $5\sqrt{3}$), except as noted in particular problems.

- Calculators are not allowed.

- In order to receive credit, you must **show all of your work**. If you do not indicate the way in which you solved a problem, you may get little or no credit for it, even if your answer is correct.

- You may use any of the 20 integrals in the table on p. 392 of the text without deriving them. **Show your work in evaluating any other integrals, even if they are on your note sheet**.

- If you need more room, use the backs of the pages and indicate that you have done so.

- Raise your hand if you have a question.

- This exam has 4 pages, plus this cover sheet. Please make sure that your exam is complete.

- You have 60 minutes to complete the exam.

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
Total	40	

1. (10 total points)

   (a) (5 points) Evaluate the indefinite integral

   $$\int \frac{x^3 - 4x + 7}{x^2 + 2x - 3} dx.$$

   (b) (5 points) Evaluate the indefinite integral

   $$\int \frac{x^3}{\sqrt{x^2 + 4}} dx.$$

2. (10 total points)

  (a) (5 points) Evaluate the definite integral

$$\int_{-2}^{2} |x^2 - 4x|\,\mathrm{d}x.$$

  (b) (5 points) Evaluate the definite integral

$$\int_{0}^{1} \sqrt{1 + e^x}\,\mathrm{d}x.$$

3. (10 total points)

    (a) (5 points) Set up an integral for the volume of the solid obtained by rotating the region bounded by $y = \dfrac{1}{1+x^2}$, $y = 0$, $x = 0$, $x = 2$ about $x = 2$. DO NOT EVALUATE.

    (b) (5 points) Solve the differential equation with the given initial condition.

$$\frac{dL}{dt} = kL^2 \ln t$$

    with $L(1) = -1$

4. (10 total points) Determine whether each integral is convergent or divergent.

  (a) (5 points) $\displaystyle\int_1^\infty \frac{x+1}{\sqrt{x^4-x}}\,dx$

  (b) (5 points) $\displaystyle\int_0^1 \frac{3}{x^5}\,dx$