Homework 7 - Math 142   **Name:** _____

Due by 5:00pm Friday, April 9. Send a PDF with your solutions to `blins@hsc.edu`.

1. Find $\displaystyle\int_0^\infty x^2 e^{-2x}\,dx$.

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2. Show that each of the following integrals diverge by finding a smaller (simpler) integral that diverges.

   (a) $\displaystyle\int_0^1 \frac{e^x}{x^2}\,dx$

   (b) $\displaystyle\int_e^\infty \sqrt{\ln x}\,dx$

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3. Find the area between the curves $y = x^2 - 4x + 3$ and $y = -x^2 + 2x + 3$.

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4. Find the volume of the region under $y = \sqrt{\sin x}$ from $x = 0$ to $x = \pi$ when it is revolved around the x-axis.

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5. Find the volume of the region under the curve $y = \dfrac{1}{x}$ from $x = 1$ to $x = 2$ when it is revolved around the x-axis.