Homework 5 - Math 142 **Name:** _____

Due by 5:00pm Friday, September 25. Send a PDF with your solutions to `blins@hsc.edu`.

1. Compute $\int_0^2 xe^{-x}\,dx$.

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2. Find $\int_0^{\pi} x\cos(4x)\,dx$.

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3. Use tabular integration to find the antiderivative of x^3e^x.

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4. Find $\int (\ln x)^2\,dx$. Hint, start by letting $u = (\ln x)^2$ and $dv = dx$, and use integration by parts twice.

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5. Find $\int \sin^3 x\cos^2 x\,dx$.

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6. Compute $\int_0^{\pi/3} \tan^3 x \sec^2 x \, dx$.

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7. Evaluate $\int \frac{\cos\theta}{\sqrt{\sin\theta}} \, d\theta$.

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8. Make a rough sketch of the slope field for the differential equation $\frac{dy}{dx} = \frac{x+y}{x-y}$. (Either hand drawn or copied and pasted from a computer is fine).

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9. Use Euler's method to estimate the value of $y(5)$ for the differential equation $\frac{dy}{dx} = \frac{x+y}{x-y}$ with initial condition $y(0) = -1$. Use $\Delta x = 0.01$.

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10. On midterm 1 we looked at the differential equation $\frac{dy}{dx} = 1 - x - y$ with initial condition $y(-1) = 0$, but we never solved it. Use Euler's method to estimate where the solution curve crosses the y-axis using $\Delta x = 0.01$ and $\Delta x = 0.001$. Does using a smaller Δx make a difference?
