Midterm II: Some problems for review

The exam will in the regular classroom (SCB 303) on Tuesday, March 11 during the regular class period (8 - 8:50 AM). You will do it on WebAssign. The exam is protected by a passcode which will be given to you at the time of the exam. You will bring your own laptop and pocket calculator (of any kind). You are not allowed to use any app on your laptop, even the calculator app. Your web browser should occupy the full screen at all time. Phones and notecards are not allowed. The instructor will provide scratched papers for you. You will have two attempts. The higher score will be your final score. All questions will be automatically graded, so you will see your score when you finish your exam or when the time is up.

The material covered is Sections 9.1-9.5, 10.1-10.4. You should review the homework problems, worksheets, quizzes, examples given in the lectures. It is always a good idea to study for the exam with someone. Some problems to practice:

1) Determine if $y = \sqrt{x}$ is a solution of the differential equation $xy' + y = 0$.

2) Solve the differential equation $y' = y - x$.

3) Solve the differential equation $y'x = e^y$.

4) Use Euler's method with step size 0.1 to estimate $y(0.3)$, where $y(x)$ is the solution of the initial-value problem $y' = y + xy$, $y(0) = 1$.

5) Plot the point with polar coordinates $(-2, 3\pi/2)$. Then find a pair of polar coordinates of this point with $r > 0$, $\theta \in [-\pi, \pi]$.

6) Sketch the polar curve $r = 2 + \cos\theta$, $0 \leq \theta \leq 2\pi$.

7) Find the equation of the tangent line to the curve $x = \ln t$, $y = 1 + t^2$ at the point $(0, 2)$.

8) Find the length of the curve $r = 1/\theta$ where $\pi \leq \theta \leq 2\pi$.

9) A population grows according to the logistic equation $P' = 0.1P - 0.0001P^2$. Time is measured in years. If the current population is 60, how long will it take for the population to double its size?