For Problem 2.3 #26, you'll need to solve for an integrating factor $\mu(x)$. You'll be able to do this exactly, but the integral requires a substitution. It will be easier to see the substitution if you rewrite

$$\sin(2x) = 2\sin(x)\cos(x).$$

In Problem 2.3 #31 you are asked to plot a piecewise-defined function. You can do this with Octave, but it can be a little futzy. Suppose we want to plot

$$f(x) = \begin{cases} x^2 & x < 1 \\ 2 - x & x \geq 1. \end{cases}$$

One way to proceed is to define a function $H(x)$ that satisfies

$$H(x) = \begin{cases} 0 & x < 1 \\ 1 & x \geq 1. \end{cases}$$

Then

$$f(x) = (1 - H(x))x^2 + H(x)(2 - x).$$

You should convince yourself why this is true.

In Octave, the function H can be obtained via

```
octave-3.4.0:8> H=@(x) x>= 1
H =

@(x) x >= 1

octave-3.4.0:9> H(3)
ans =  1
octave-3.4.0:10> H(0.5)
ans = 0
```

You can then make the piecewise function using

```
octave-3.4.0:2> f1=@(x) x.^2
f1 =

@(x) x .^ 2

octave-3.4.0:3> f2=@(x) 2-x
f2 =

@(x) 2 - x

octave-3.4.0:4> f=@(x) (1-H(x)).*f1(x)+H(x).*f2(x);
octave-3.4.0:5> x=0:0.01:2;
octave-3.4.0:6> plot(x,f(x))
```

This generates the following plot: