

Name: _____

Evaluation 8

Introductory Programming
Fall 2005

1. Fill in the body of the function `f` in accordance with the comments. You don't have to fill in `acceleration`; you can assume that it will be filled in by someone else. Remember that `x'` is not a legal variable name in MATLAB.

```
function dXdt = f(t, X)
% this function takes a column vector with 4 components, [x, y, x', y']
% and returns a column vector with components [x'', y'', x''', y''']
% it uses the function acceleration to compute x''' and y'''.
```

```
end
```

```
function A = acceleration(V)
% this function takes a vector with components [x', y']
% and returns a vector with [x'', y'']
A = blah, blah...
end
```

2. Assuming that these functions are in a file named `projectile`, show how you would use them to compute the velocity and acceleration of an object at time $t = 0$ that is at position $(0, 0)$ with velocity $(20, 30)$.

3. Show how you would use `ode45` to estimate the position and velocity of the object for 30 seconds, starting from the same conditions as in the previous question.