

MAC 2312
Quiz 1
September 3, 2008

1) Find the following antiderivatives:

$$\int (u^3 + 2)^3 du$$

$$\int \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} dx$$

$$\int \frac{\sin x}{\cos^2 x} dx$$

$$\int \frac{x^2 + x^3}{\sqrt{x}} dx$$

2) Fred and George are driving down the interstate. Fred is going 100 ft/sec (just under 70 mph), while George is driving 90 ft/sec (just over 60 mph). At one moment (which we will call $t = 0$), Fred is 200 ft in front of George. At this very moment, Fred decides that he is too far ahead of George, and so he begins to decelerate at a rate of 2 ft/sec². At exactly the same moment, George decides that he is too far behind Fred, and so he begins to accelerate at a rate of 1 ft/sec². So, let's ask the obvious questions:

- a) How long does it take for George to catch up with Fred?
- b) How far does George drive before he catches up with Fred?
- c) How fast are both George and Fred going when George catches up?

Your answers will not come out as nice whole numbers. Give your answers rounded to two decimal places.