HOMEWORK 7

Find the antiderivative of the following:

1.) $f(x) = 5\sqrt{x} + \frac{1}{x}$
2.) $g(x) = e^{2x} + 1$
3.) $h(t) = 4t^{-3} + 3t^{-2} + 2t^{-1}$

Find $f$ given the following information:

4.) $f'(x) = x^2 + 3x + 1$, given that $f(1) = 3$.
5.) $f''(x) = 2x + 5$, given that $f(1) = 3$ and $f'(1) = 2$.

6.) The acceleration of a rocket is -9.8 meters per second. At a time of one second, the rocket has a velocity that is clocked at 156.8 meters per second, and at two seconds, the rocket reaches a height of 2000 meters. Find the equation to describe the rocket’s height off the ground.

7.) Jim mistakenly buys an aquarium that only fits 200 fish. The growth constant for the fish is given by $k = .007$ (time units here are in hours). He puts in 150 fish, hoping that the number will double soon. (It won’t.) How many fish will there be after 2 hours? 50 hours?

8.) A viral video is seen by 100 people in the first hour and 500 people in the first three hours. There are 500,000 people who are liable to see the video at some point (i.e. the population is 500,000). How many people will see the video after 10 hours? (Hint: use the epidemic equation).

9.) Say that inflation is five percent. Which is a better deal: I give you $100 now, or I give you $150 in five years? What would the "$150 in five years" be worth now? What would the "$100 now" be worth in five years?

10.) In the previous question, what inflation rate would be required for the $100 now to be worth exactly $150 in five years?

11.) Now, let’s say inflation is 3% a year (as is usually the case). The current Powerball jackpot is $184 million dollars. The jackpot is split into twenty equal payments; the first one is given today, the second given one year from today, the third given two years from today, and so on until the twentieth payment is given nineteen years from today. How much is the jackpot actually worth?