Quiz 2

1. Suppose that the bacteria in a colony grow unchecked according to the Law of Exponential Change, meaning that the population $P(t)$ as a function of t satisfies

$$\frac{dP}{dt} = kP.$$

The colony starts with 5 bacterium and triples in number every 30 minutes. Find a function which gives the number of bacterium after t hours.   (6 pts.)

2. Solve the separable differential equation.   (7 pts.)

$$\sqrt{x^2 y^2 + y^2}\,\frac{dy}{dx} = x$$

3. Integrate. *(Hint: IBP)* (7 pts.)

$$\int \frac{\ln x}{x^2} \, dx$$