1. (12 points) Evaluate each of the following:
   a. \( \lim_{x \to \infty} \left(1 + \frac{4}{x}\right)^{2x} \)

   b. \( \int \frac{5x^2 - 6x + 12}{(x-3)(x^2+4)} \, dx \)

2. (8 points) A ball is dropped from a height of 12 feet and each time it hits the ground it bounces up to a height of two thirds of the previous height. Find the total distance traveled by the ball.