1. How long, to the nearest year, it will take me to become a millionaire if I invest $1000 at 10% interest compounded continuously?

It will take .................. years.

2. The total cost to a company for selling $n$ widgets is $c(n) = n^2 + 4n + 100$. The price per widget is $p(n) = 100 - n$. What price per widget will yield the maximum profit for the company?

The price that will give the greatest profit is ..................
3. A volatility index measures the extent to which a market undergoes sudden changes in value. The volatility of the Nasdaq (as measured by one such index) had an average rate of change of 0 points/year during 1992-1995 and was increasing at an average rate of about 0.2 point per year during 1995-1998. In 1995 the volatility of the Nasdaq was 1.1. Use this information to give a rough sketch of the volatility of the Nasdaq as a function of time, showing its values in 1992-1998.

4. Sketch the graph of a function that is continuous on the interval [0,4], differentiable on the interval (0,4), and whose derivative is never negative, and is zero at exactly one point.

5. If the average cost to manufacture one grand piano increases as the production level increases, which is greater, the marginal cost or the average cost? Explain.

The .................... is greater.
6. a virus is spreading through a population in a manner that can be modeled by the function 

\[ g(t) = \frac{A}{1 + Be^{-t}} \]

where \( A \) is the total population, \( g(t) \) is the number infected at time \( t \), and \( B \) is a constant. What proportion of the population is infected when the virus is spreading the fastest?

This proportion is .................... .

7. A car traveling down a road has a velocity of \( v(t) = 60 - e^{-t/10} \) miles per hour at time \( t \) hours. Find the total distance it travels from time \( t = 1 \) hour to time \( t = 6 \). (Round your answer to the nearest mile).

The total distance traveled is .....................