QUIZ 6 - MATH 111 Friday, November 5

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Sound exerts a pressure P on the human ear. This pressure increases as the loudness of the sound increases. It is convenient to measure the loudness D in decibels and the pressure P in dynes per square centimeter. It has been found that each increase of 1 decibel in loudness causes a 12.2% increase in pressure. Furthermore a sound of loudness 97 decibels produces a pressure of 15 dynes per square centimeter.

   (a) Explain why P is an exponential function of D and find the corresponding growth factor.

   (b) Find $P(0)$ and explain in practical terms what the answer means.

   (c) Find an exponential model for P as a function of D.

   (d) When pressure on the ear reaches a level of about 200 dynes per square centimeter physical damage may can occur. What decibel level of sound should be considered dangerous?