Advanced Math
3-5
(Day 2)
Exponential and Logarithmic Models

Use the Richter scale, $R = \log_{10} \frac{I}{I_0}$, for measuring the magnitudes of earthquakes.

→ Intensity
↳ initial Intensity

57) Find the magnitude of an earthquake of intensity I (let $I_0 = 1$).

a) $I = 80,500,000$

$R = \log_{10} 80,500,000$

$R = 7.906$

b) $I = 48,275,000$

$R = \log_{10} 48,275,000$

$R = 6.684$

Use the following information for determining sound intensity. The level of sound β, in decibels, with an intensity of I is given by: $\beta(I) = 10 \log_{10} \frac{I}{I_0}$ where I_0 is an intensity of 10^{-16} watts per square centimeter, corresponding roughly to the faintest sound that can be heard by the human ear.

59) $I = 10^{-4}$ watts per cm^2 (threshold of pain):

$\beta(10^{-4}) = 10 \log_{10} \frac{10^{-4}}{10^{-16}}$

$= 10 \log_{10} 10^{12}$

$= 120 \, dB$

Assignment:
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21, 22,
45 - 48 all,
50 - 68 even.