

Name _____

9-6B Lesson Master

Questions on SPUR Objectives

See Student Edition pages 656–659 for objectives.

SKILLS Objective C

In 1-6, use the formula $D = 10 \log \left(\frac{N}{10^{-12}} \right)$, which gives the measure in D decibels (dB) for a sound with intensity N given in $\frac{W}{m^2}$ (watts per square meter).

1. The sound intensity of traffic on a busy toll road is measured at $5.87 \cdot 10^{-3} \frac{W}{m^2}$. How intense is this sound as measured by the decibel scale? _____
2. Find the intensity of a sound which has a relative intensity of 73 decibels. _____
3. Find the relative intensity in decibels of a sound with intensity $3.16 \cdot 10^{-4} \frac{W}{m^2}$. _____
4. Find the intensity, in $\frac{W}{m^2}$, of a sound having a relative intensity of 95 dB. _____
5. Find the relative intensity in decibels of air conditioning in which the sound intensity is $10^{-6} \frac{W}{m^2}$. _____
6. Find the intensity, in $\frac{W}{m^2}$, of a freight train having a relative intensity of 75 dB. _____

In 7-12, use the formula $pH = -\log H^+$ to find the pH of a solution in which H^+ is the concentration of hydrogen ions in moles per liter.

7. What is the pH of a solution that has a concentration of hydrogen ions of 10^{-9} moles per liter? _____
8. What is the concentration of hydrogen ions in a solution with a pH of 5? _____
9. What is the pH of a solution that has a concentration of hydrogen ions of $5.62 \cdot 10^{-6}$ moles per liter? _____
10. What is the concentration of hydrogen ions in a solution with a pH of 2.5? Express your answer in scientific notation. _____
11. What is the concentration of hydrogen ions in a sample of stream water with a pH of 7.8? Express your answer in scientific notation. _____
12. A soil sample from a desert has a concentration of hydrogen ions of $3.16 \cdot 10^{-10}$ moles per liter. What is the pH? _____

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USES Objective I

In 13–24, use the formulas $D = 10 \log \left(\frac{N}{10^{-12}} \right)$ and $pH = -\log H^+$.

13. When exposed to noise levels of 80 dB for several hours, a person's hearing may be affected for half a day. However, even a single, short exposure to noises of 160 dB may cause physical damage inside the ear. This noise that damages the ear is how many times as intense as the noise that only temporarily affects hearing? _____
14. The noise from a riveting machine measures 100 dB. The noise in a busy office measures 65 dB. How many times as intense is the noise from the machine as the noise from the office? _____
15. The noise level in a classroom measures 55 dB. If the noise level in the gym is 3 times as intense, how many decibels would it be? _____
16. The pH of rainwater is 5.6. Atmospheric pollutants have caused acid rain, which in some regions has a pH of 4.6. How many times as great is the concentration of hydrogen ions in acid rain as in the normal rainwater? _____
17. A solution has a pH of 9.5. What would be the pH of a solution that has twice the concentration of hydrogen ions? _____
18. A soil sample from garden *A* has a pH of 6.2. A sample from garden *B* has a pH of 6.8. The soil in garden *B* is how many times as alkaline as the soil in garden *A*? _____
19. Elena is speaking at a normal level of 60 decibels, while Ito is whispering at a level of 30 decibels. Elena's normal voice is how many times as intense as Ito's whisper? _____
20. While playing at a relative intensity of 115 decibels, a band was instructed to lower the output to 100 decibels. How many times as intense was the original sound as the softer sound? _____
21. What is the measure of a conversation which is twice as intense as a conversation which measures 60 decibels? _____
22. Bile can range from a concentration of pH 9 to pH 11. The stronger alkaline solution is how many times as concentrated as the weaker alkaline solution? _____
23. Hydrochloric acid has a pH of 1, and gastric juices have a pH of about 2. The concentration of hydrochloric acid is about how many times that of gastric juices? _____
24. Soap *A* has pH 7.4 and soap *B* has pH 7.7. How many times as alkaline as soap *A* is soap *B*? _____