

PROBLEM SOLVING

EXAMPLE 5

on p. 509
for Exs. 69–72

69. **CONVERSATION** Three groups of people are having separate conversations in a room. The sound of each conversation has an intensity of 1.4×10^{-5} watts per square meter. What is the decibel level of the combined conversations in the room?

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70. **PARKING GARAGE** The sound made by each of five cars in a parking garage has an intensity of 3.2×10^{-4} watts per square meter. What is the decibel level of the sound made by all five cars in the parking garage?

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71. **★ SHORT RESPONSE** The intensity of the sound TV ads make is ten times as great as the intensity for an average TV show. How many decibels louder is a TV ad? *Justify* your answer using properties of logarithms.

Intensity of Television Sound

  <p>During show: Intensity = I</p>	  <p>During ad: Intensity = $10I$</p>
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72. **BIOLOGY** The loudest animal on Earth is the blue whale. It can produce a sound with an intensity of $10^{6.8}$ watts per square meter. The loudest sound a human can make has an intensity of $10^{0.8}$ watts per square meter. *Compare* the decibel levels of the sounds made by a blue whale and a human.
73. **★ EXTENDED RESPONSE** The f-stops on a 35 millimeter camera control the amount of light that enters the camera. Let s be a measure of the amount of light that strikes the film and let f be the f-stop. Then s and f are related by the equation:

$$s = \log_2 f^2$$



- a. **Use Properties** Expand the expression for s .
- b. **Calculate** The table shows the first eight f-stops on a 35 millimeter camera. Copy and complete the table. *Describe* the pattern you observe.

f	1.414	2.000	2.828	4.000	5.657	8.000	11.314	16.000
s	?	?	?	?	?	?	?	?

- c. **Reasoning** Many 35 millimeter cameras have nine f-stops. What do you think the ninth f-stop is? *Explain* your reasoning.

