

**LESSON** **8-6** **Problem Solving**  
**Radical Expressions and Rational Exponents**

On a guitar the distance a fret should be placed from the bridge is related to a string's root note length by the function  $d(n) = r\left(2 - \frac{n}{12}\right)$ , where  $r$  is the length of the root note string and  $n$  is the number of notes higher than that string's root note. If the length of the root note string is 50-cm:

1. Find the distance from the bridge for a fret that produces a note exactly one octave (12 notes) higher than the root note.
  - a. Substitute values for  $r$  and  $n$  in the given function.  $d(12) = 50\left(2^{-\frac{12}{12}}\right) = 50.2^{-1}$
  - b. How far from the bridge should the fret be placed? \_\_\_\_\_
  - c. What fraction of the string length is the distance of this fret from the bridge? \_\_\_\_\_
2. Complete the table to find the distance from the bridge, for frets that produce every other note of an entire scale on this string.

<b>Notes Higher than the Root Note</b>	2	4	6	8	10	12
<b>Distance of Fret from Bridge (cm)</b>						

**Choose the letter for the best answer.**

3. Which formula could you use to find the area of one side of a cube if the volume were given?
  - A  $A = V^{\frac{3}{2}}$
  - B  $A = V^{\frac{2}{3}}$
  - C  $A = V^{-\frac{2}{3}}$
4. A party tent in the shape of a hemisphere has a volume of  $14,130 \text{ m}^3$ . What is the area of the ground that the tent covers in square meters?
  - F 706.5
  - G 1121.5
  - H 1256.0

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On a guitar the distance a fret should be placed from the bridge is related to a string's root note length by the function  $d(n) = r\left(2 - \frac{n}{12}\right)$ , where  $r$  is the length of the root note string and  $n$  is the number of notes higher than that string's root note. If the length of the root note string is 50-cm:

1. Find the distance from the bridge for a fret that produces a note exactly one octave (12 notes) higher than the root note.

- a. Substitute values for  $r$  and  $n$  in the given function.  $d(12) = 50\left(2 - \frac{12}{12}\right) = 50 \cdot 2^{-1}$   
 b. How far from the bridge should the fret be placed? 25 cm  
 c. What fraction of the string length is the distance of this fret from the bridge?  $\frac{1}{2}$

2. Complete the table to find the distance from the bridge, for frets that produce every other note of an entire scale on this string.

Notes Higher than the Root Note	2	4	6	8	10	12
Distance of Fret from Bridge (cm)	44.5	39.7	35.4	31.5	28.1	25

Choose the letter for the best answer.

3. Which formula could you use to find the area of one side of a cube if the volume were given?

- A  $A = V^{\frac{3}{2}}$   
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4. A party tent in the shape of a hemisphere has a volume of  $14,130 \text{ m}^3$ . What is the area of the ground that the tent covers in square meters?

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