Reteaching 8-6  

**Square Roots and Irrational Numbers**

The number 25 is a **perfect square**.

It is the square of the whole number 5.  \[ 5^2 = 25 \]

5 is the **square root** of 25.  \[ 5 = \sqrt{25} \]

You can find the length of a side of a square by finding the square root of the area.

\[
\begin{align*}
  s^2 &= A = 225 \\
  s &= \sqrt{A} = \sqrt{225} = 15
\end{align*}
\]

The length of each side is 15 in.

You can use patterns to find the square roots of some larger numbers.

\[
\begin{align*}
  9^2 &= 81 \rightarrow 90^2 = 8,100 \\
  9 &= \sqrt{81} \rightarrow 90 = \sqrt{8,100}
\end{align*}
\]

A **rational number** is a ratio of two integers, \( \frac{a}{b} \), where \( b \neq 0 \). Since terminating decimals and repeating decimals can be written as ratios, they are rational. Irrational numbers are numbers that cannot be written as ratios. Decimals that do not end or repeat are irrational numbers.

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**Find each of the following.**

1. \( \sqrt{144} \)  
2. \( \sqrt{36} \)  
3. \( \sqrt{100} \)

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4. \( \sqrt{2,500} \)  
5. \( \sqrt{324} \)  
6. \( \sqrt{400} \)

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**Find the length of a side of a square with the given area.**

7. \( A = 49 \text{ cm}^2 \)  
   side = \( \sqrt{49} = \)  

8. \( A = 81 \text{ in.}^2 \)  
   side = \( \sqrt{81} = \)  

9. \( A = 144 \text{ cm}^2 \)  
   side = \( \sqrt{144} = \)  

10. \( A = 625 \text{ in.}^2 \)  
11. \( A = 676 \text{ ft}^2 \)  
12. \( A = 3,600 \text{ yd}^2 \)

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**Identify each number as rational or irrational.**

13. \( \frac{11}{3} \)  
14. \( \sqrt{15} \)  
15. 7  
16. \( \sqrt{144} \)