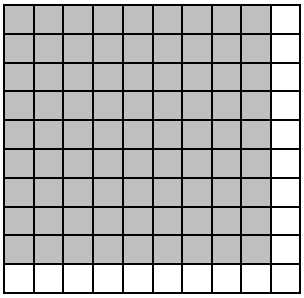
## Section 1.1 Square Roots of Perfect Squares

To determine the **area** of a square, we multiply the side length by itself.
That is, we square the side length.



$\text{Area} = \text{side length}^2$

$= \left(\frac{9}{10}\right)^2$

$= \frac{9}{10} \times \frac{9}{10}$

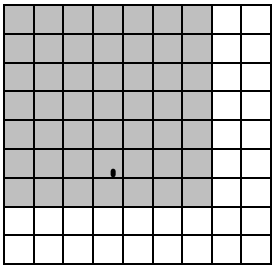
$= \frac{81}{100}\ \text{units}^2$

To determine the **side length** of a square, we calculate the square root of its area.

$\text{Side length} = \sqrt{\text{Area}}$

$= \sqrt{\frac{49}{81}}$

$= \frac{7}{9}\ \text{units}$




Squaring and taking the square root are opposite, or inverse, operations.
The side length of a square is the square root of its area.

That is, $\sqrt{\frac{225}{100}} = \frac{15 \div 5}{10 \div 5} = \frac{3}{2}$ and $\sqrt{\frac{169}{100}} = \frac{13}{10}$

We can rewrite these equations using decimals:

$\sqrt{2.25} = 1.5$ and $\sqrt{1.69} = 1.3$

The square roots of some fractions are repeating decimals.

Ex: $\sqrt{\frac{1}{9}} = \frac{1}{3} = 0.\overline{3} = 0.3333\ldots.$

A fraction in simplest form is a **perfect square** if it can be written as a product of two equal fractions.

ex: $\frac{6 \div 6}{18 \div 6} = \frac{1}{3}$ ← perf. sq.; ← Not perf. sq.

$\frac{6}{18}$ is not a perfect square.

↑ therefore

Example (1): Calculate the number whose square roots is:

a) $\frac{3}{8}$

$\sqrt{?} = \frac{3}{8}$

$\left(\frac{3}{8}\right)^2 = \frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$

b) 1.8

$\sqrt{?} = 1.8$

$(1.8)^2 = 1.8 \times 1.8 = 3.24$

Example (2): Is each fraction a perfect square? Explain your reasoning. *Simplest Form*

a) $\frac{8}{18} \div 2 \div 2 = \frac{4}{9}$

Yes $\frac{8}{18}$ is a perf. sq. Since, $\frac{2}{3} \times \frac{2}{3} = \frac{4}{9} = \frac{8}{18}$

b) $\frac{16}{5}$

No, $\frac{16}{5}$ is not a perf. sq. since you cannot mult. a # by itself to get $\frac{16}{5}$

c) $\frac{2}{9}$

No, $\frac{2}{9}$ is not a perf. square. Since you cannot mult. a # by itself to get $\frac{2}{9}$

Example (3): Is each decimal a perfect square? Explain your reasoning.

a) 6.25

$\sqrt{6.25} = 2.5$

Yes 6.25 is a perf. sq. Since the sq. root is a TERMINATING DECIMAL

b) 0.627

$\sqrt{0.627} = 0.79183\ldots$

0.627 is NOT a perf. square Since $\sqrt{0.627}$ is IRRATIONAL.

H.W (p. 11 – 13) #3-5, 8, 9(c, d, e, f) , 10, 11 (a, b, c), 13 (a), 14, 15, 16