Chapter 1

Square Roots and Surface Area

PERFECT SQUARE:

A number that is the square of a number

For example 25 is a perfect square because $5^2 = 25$

Which of the following are perfect squares?

a) 23   b) 36   c) 10   d) 49

NO   6 X 6   No   7 X 7
                              (5x2)
                              (1x10)

List the first 15 perfect squares

Perfect Square

$$1 \times 1 = 1$$

$2 \times 2 = 4$

$3 \times 3 = 9$

$4 \times 4 = 16$

$5 \times 5 = 25$

$6 \times 6 = 36$

$7 \times 7 = 49$

$8 \times 8 = 64$

$9 \times 9 = 81$

$10 \times 10 = 100$

$11 \times 11 = 121$

$12 \times 12 = 144$

$13 \times 13 = 169$

$14 \times 14 = 196$

$15 \times 15 = 225$

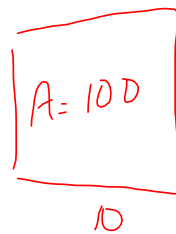Draw a SQUARE that represents an area of: 4

Area of Square

Area= 4

2

Can you draw a square to represent an area of 12? Why or Why not?

12   1

6   2

3   4

* When using your calculator to
determine if a number is a perfect square you take the square root and your answer
must terminate! [stop]

If a square has an area of 100 what is the length
of one side [side length]?

Draw a picture

$A = 100$

10

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

$$= \sqrt{100}$$

$$= 10$$

What would the perimeter be?

← square

$$P = S_1 + S_2 + S_3 + S_4$$

$$= 10 + 10 + 10 + 10$$

$$= 40$$

$$P = 4S$$

$$= 4(10)$$

$$= 40$$

Evaluate

$13^2 = 169$

$\sqrt{169} = 13$

Squaring a number and taking the square root of a number are opposite [inverse] operations

Squaring a number and the square root of a number are opposite or inverse operations.

Find the side length

Area = 64

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

S. L = $\sqrt{64}$

S. L = 8

Complete the table

1. **Write the area as a product.**
2. **Write the side length as a square root.**

$$S.L = \sqrt{Area}$$

Area as a Product	Side Length as a Square Root
$49 = 7 \times 7$	$\sqrt{49} = 7$
$\dfrac{49}{100} = \dfrac{7 \times 7}{10 \times 10}$	$\sqrt{\dfrac{49}{100}} = \dfrac{7}{10}$ $\dfrac{\sqrt{49}}{\sqrt{100}} =$
$64 = 8 \times 8$	$\sqrt{64} = 8$
$\dfrac{64}{100} = \dfrac{8 \times 8}{10 \times 10}$	$\sqrt{\dfrac{64}{100}} = \dfrac{8}{10}$
$121 = 11 \times 11$	$\sqrt{121} = 11$
$\dfrac{121}{100} = \dfrac{11 \times 11}{10 \times 10}$	$\sqrt{\dfrac{121}{100}} = \dfrac{11}{10}$

How can you use the square roots of whole numbers to determine the square roots of fractions?

Look at the numerator and denominator **separately** and determine the square root of each.

Fraction must always be in **SIMPLEST FORM** to determine if it is a perfect square!!!! ↖ lowest terms

Is this a perfect square?

1. As the question is written the answer is NO, this is not a perfect square.
2. If not in lowest terms you must reduce the fraction to determine if it is a perfect square.
3. Both the numerator and denominator must be perfect squares to say the fraction is a perfect square.

Are these perfect squares?

A. 225
   100

B. 196
   81

C. 128
   800

Which numbers below are perfect squares.

i) 25   **ii) 24**   **iii) 20**
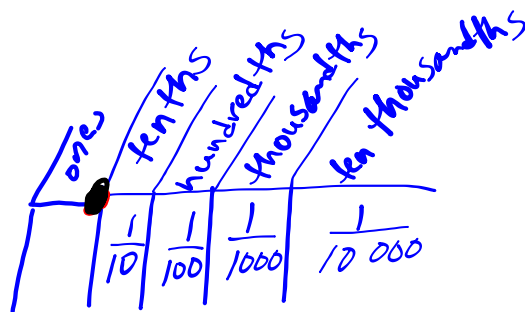
How can we use the square roots of whole numbers to determine the square roots of decimals?

Convert a decimal to a fraction then determine the square root of the numerator and denominator.

one | tenths | hundredths | thousandths | ten thousandths

$\frac{1}{10}$ | $\frac{1}{100}$ | $\frac{1}{1000}$ | $\frac{1}{10\,000}$

Are these perfect squares?

a) $\frac{1}{10}$

b) $\frac{1}{100}$

c) $\frac{1}{1000}$

d) $\frac{1}{10\,000}$

No Calculator

Which of the following are perfect squares?

A. $\dfrac{75}{300}$

B. $\dfrac{196}{81}$

A. $\sqrt{0.25}$

B. $\sqrt{1.96}$

Square Root of a Decimal

Decimal	Fraction	Square Root
A. 0.49		
B. 0.64		
C. 1.21		
D. 1.44		

What are the equal fractions that will give 1/9?