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 $5^2 = 25$

$5 \times 5 = 25$

Which of the following are perfect squares?

a) 23 Prime

1x23

NO

b) 36

6x6

yes

c) 10

1x10

2x5

NO

d) 49

7x7

yes

List the first 15 perfectsquares

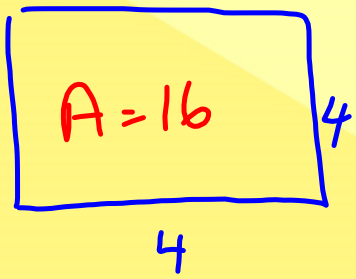
Perfect Square

1 X 1 = 1
2 x 2 = 4
3 x 3 = 9
4 x 4 = 16
5 x 5 = 25
6 x 6 = 36
7 x 7 = 49
8 x 8 = 64
9 x 9 = 81
10 x 10 = 100
11 x 11 = 121
12 x 12 = 144
13 x 13 = 169
14 x 14 = 196
15 x 15 = 225

The first 15 perfect squares are:

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

Draw a SQUARE that represents an area of 16.



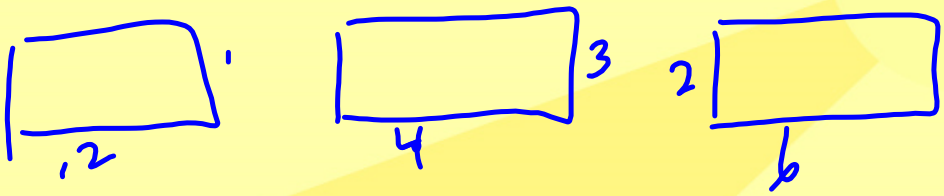
$A = bh$
$= 4 \times 4$
$= 16$

Area of square = $(\text{Side})^2$

$A = S^2$

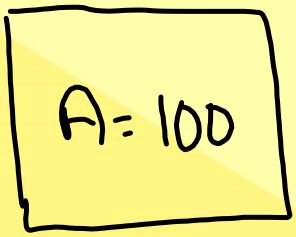
Can you draw a square to represent an area of 12?
Why or Why not?

No because 12 is not a perfect square



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

Draw a picture



$Area = S^2$

$\sqrt{100} = \sqrt{S^2}$

$10 = side$

What would the perimeter be?

$P = S_1 + S_2 + S_3 + S_4$

$P = 10 + 10 + 10 + 10$

$P = 40$

Evaluate

$13^2 = 169$ Squared the number

$\sqrt{169} = 13$ Square of the number

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

Find the side length

$\text{Area} = s^2$

$\sqrt{64} = \sqrt{s^2}$

$8 = s$

Complete the table

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

$A = s^2$ side length $= \sqrt{\text{area}}$

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

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.

Lowest terms

Fraction must always be in SIMPLIEST FORM to determine if it is a perfect square!!!!

Is this a perfect square?

[both numerator and denominator must be a perfect square]

$\frac{50}{200}$

No at first therefor put in lowest terms

$\frac{1}{4}$ ← 1x1

← 2x2

yes

Are these perfect squares?

A. $\frac{225}{100}$ ← 15x15, 10x10 ←

yes

B. $\frac{196}{81}$ ← 14x14, 9x9 ←

yes

C. $\frac{128}{800}$

Lowest terms

$\frac{8}{50} : \frac{4}{25}$ ← 2x2, ↑ 5+5

yes

Which numbers below are perfect squares.

i) 25 ii) 24 iii) 20