

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

No

b) 36

6×6

c) 10

1×10
 2×5
NO

d) 49

7×7

List the first 15 perfect squares

Perfect Square

$$1 \times 1 = 1$$

$$2 \times 2 = 4$$

$$3 \times 3 = 9$$

$$4 \times 4 = 16$$

$$5 \times 5 = 25$$

$$6 \times 6 = 36$$

$$7 \times 7 = 49$$

$$8 \times 8 = 64$$

$$9 \times 9 = 81$$

$$10 \times 10 = 100$$

$$11 \times 11 = 121$$

$$12 \times 12 = 144$$

$$13 \times 13 = 169$$

$$14 \times 14 = 196$$

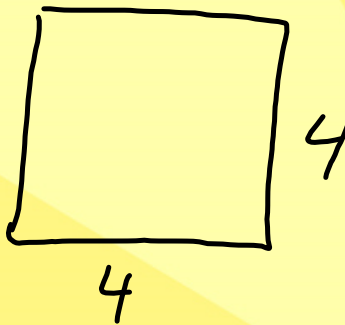
$$15 \times 15 = 225$$

Draw a SQUARE that represents 16.

$$A = l \times w$$

$$A = S^2$$

$$\text{Area} = [\text{side}]^2$$



$$A = S^2$$

$$A = 4^2$$

$$A = 16$$

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

↳ all sides are equal

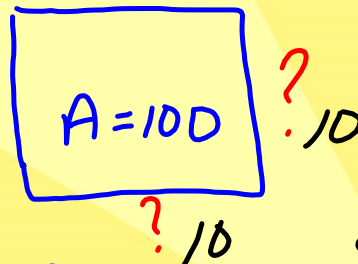
12x1
3x4
2x6

Not a perfect square

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

Draw a picture

$A = 100$
side length = 10



What would the perimeter be?

$$\begin{aligned}
 P &= S_1 + S_2 + S_3 + S_4 \quad \text{OR} \quad P = 4S \\
 &= 10 + 10 + 10 + 10 & & = 4(10) \\
 &= 40 & & = 40
 \end{aligned}$$

SQUARE side

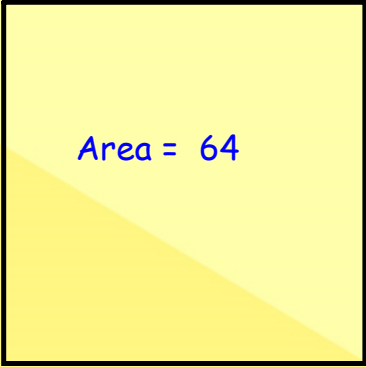
Evaluate

$$13^2 = 169$$

$$\sqrt{169} = 13$$

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

Find the side length



Area = 64

Complete the table

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

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

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?

$$\frac{50}{200}$$

$$\frac{5}{20} = \frac{1}{4}$$

← 1x1

← 2x2

yes

Are these perfect squares?

A. $\frac{225}{100}$

15x15
10x10

yes

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

14x14
9x9

yes

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

$\frac{16}{25}$

4x4
5x5

yes

D. $\frac{53}{36}$

no
6x6

NO

Which numbers below are perfect squares.

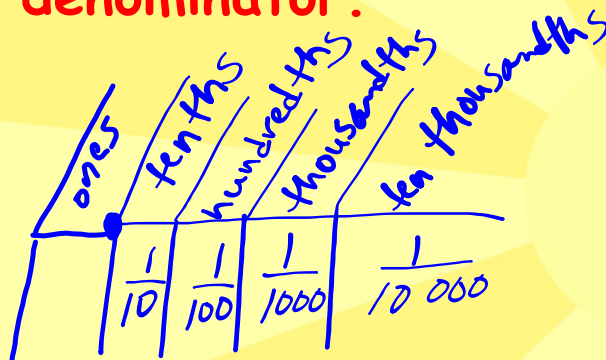
i) 25

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.



Are these perfect squares?

a) $\frac{1}{10}$ ← $|x|$
 NO
 (NO)

b) $\frac{1}{100}$ ← $|x|$
 YES
 (yes) \uparrow 10×10

c) $\frac{1}{1000}$ ← $|x|$
 NO

d) $\frac{1}{10000}$ ← $|x|$
 YES
 \uparrow 100×100

No Calculator

Which of the following are perfect squares?

A. $\frac{75}{300} = \frac{1}{4}$

Handwritten notes: "yes" (circled), 1×1 (with arrow to 1), 2×2 (with arrow to 4)

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

Handwritten notes: "yes" (circled), 14×14 (with arrow to 196), 9×9 (with arrow to 81)

