Curriculum Outcome

(N5) Determine the square root of positive rational numbers that are perfect squares.

(N6) Determine an approximate square root of positive rational numbers that are non-perfect squares.

(SS2) Determine the surface area of composite 3-D objects to solve problems

(N4) **Explain and apply the order of operations, including exponents, with and without technology.**

1.1 & 1.2
Square Roots & Perfect Squares

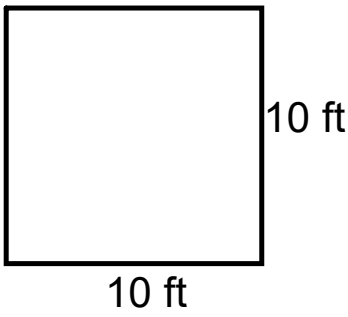
A new parking lot is a square with a side length of 10 ft by 10 ft. What is the area of the parking lot?

What is the formula for area of a square?

Area = base x height

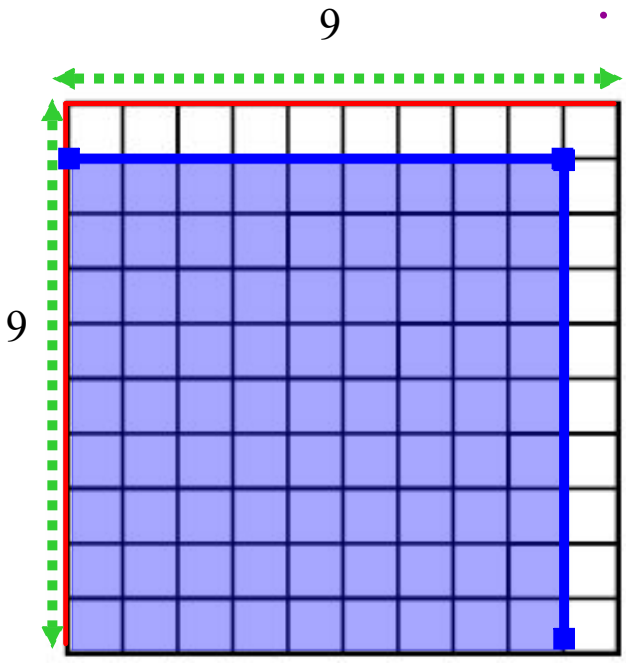
= 10ft x 10ft $= 10^2$

= 100 ft^2



$5^2 = 5 \times 5$

$5 \times 5 \times 5 \times 5 = 5^4$



What is the area of the blue square?

Area = base x height

= 9 x 9

= 81 units

Lets look at the opposite

A new parking lot is a square with an area of 225 m^2. What is the side length of the square?

Think Area of a Sqaure

"Square" THEN...
Base = Height

Area = base x height

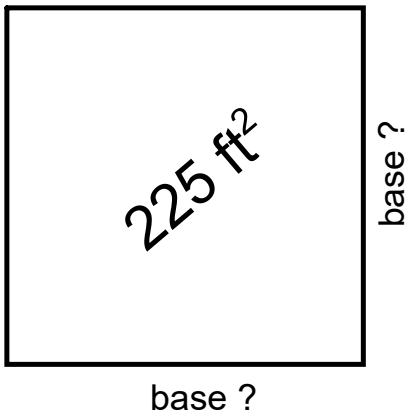
Area = base x base

$\text{Area} = (\text{base})^2$

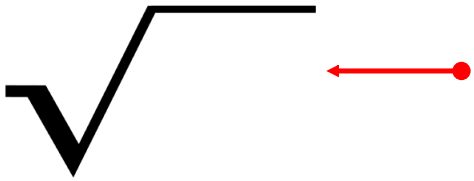
$225 = (\text{base})^2$

$\sqrt{225} = \sqrt{(\text{base})^2}$

$15 = \text{base}$



Square Root is the opposite to Squaring a number



This is the symbol to represent "Square Root"

x^y

$\sqrt{64} = 8$

Area of a square

$$\text{Area} = \text{base} \times \text{height}$$

$$\text{Area} = \text{base} \times \text{base}$$

$$\text{Area} = (\text{base})^2$$

- If given side length and asked to find area

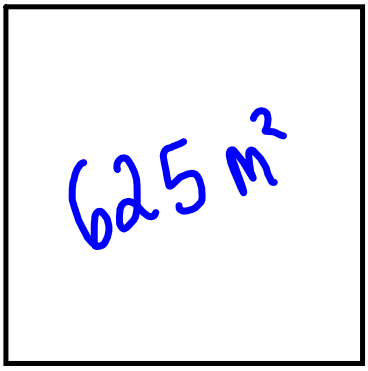
$$(\text{side})^2$$

- If given area and asked to find side length

$$\sqrt{(\text{Area})}$$

Area of square

The Area of a square is 625 m^2, what is the length of the side?



$$\text{Area} = (\text{base})^2$$

$$625 = (\text{base})^2$$

$$\sqrt{625} = \sqrt{(\text{base})^2}$$

$$25 = \text{Base}$$

Area of a Square	Side length as a Sqaure Root
9	3
16	4
36	6
169	13
25	5
10 000	100

Perfect Squares

$(1)^2 = 1 \times 1 = \mathbf{1}$

$(2)^2 = 2 \times 2 = \mathbf{4}$

$(3)^2 = 3 \times 3 = \mathbf{9}$

$(4)^2 = 4 \times 4 = \mathbf{16}$

$(5)^2 = 5 \times 5 = \mathbf{25}$

$(6)^2 = 6 \times 6 = \mathbf{36}$

$(7)^2 = 7 \times 7 = \mathbf{49}$

$(8)^2 = 8 \times 8 = \mathbf{64}$

$(9)^2 = 9 \times 9 = \mathbf{81}$

$(10)^2 = 10 \times 10 = \mathbf{100}$

$(11)^2 = 11 \times 11 = \mathbf{121}$

$(12)^2 = 12 \times 12 = \mathbf{144}$

$(13)^2 = 13 \times 13 = \mathbf{169}$

$(14)^2 = 14 \times 14 = \mathbf{196}$

$(15)^2 = 15 \times 15 = \mathbf{225}$

$(16)^2 = 16 \times 16 = \mathbf{256}$

$(17)^2 = 17 \times 17 = \mathbf{289}$

$(18)^2 = 18 \times 18 = \mathbf{324}$

$(19)^2 = 19 \times 19 = \mathbf{361}$

$(20)^2 = 20 \times 20 = \mathbf{400}$

$(21)^2 = 21 \times 21 = \mathbf{441}$

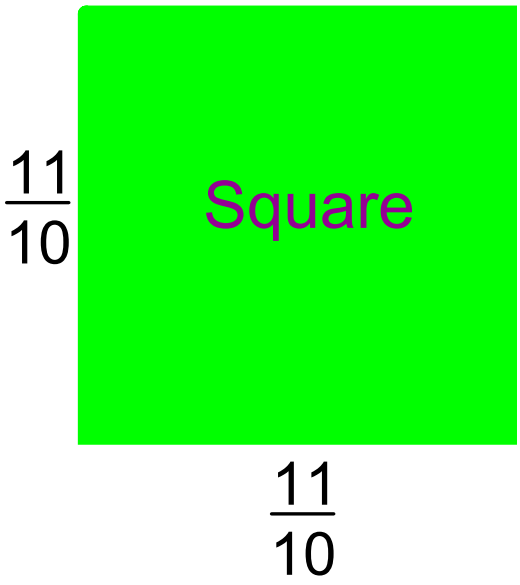
$(22)^2 = 22 \times 22 = \mathbf{484}$

$(23)^2 = 23 \times 23 = \mathbf{529}$

$(24)^2 = 24 \times 24 = \mathbf{576}$

$(25)^2 = 25 \times 25 = \mathbf{625}$

What is the area of the following



What is the area?

$$\text{Area} = (\text{base})^2$$

$$= \left(\frac{11}{10}\right)^2$$

$$= \frac{121}{100}$$

What is the perimeter?

$$P = \text{side} + \text{side} + \text{side} + \text{side}$$

$$= \frac{11}{10} + \frac{11}{10} + \frac{11}{10} + \frac{11}{10}$$

$$= \frac{44}{10}$$

Area of square = $\frac{49}{81}$ cm^2

What is the length of the sides?

$$\text{Area} = (\text{base})^2$$

$$\frac{49}{81} = (\text{base})^2$$

$$\sqrt{\frac{49}{81}} = \sqrt{(\text{base})^2}$$

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

What it the perimeter of the square

P = side + side + side + side

$$= \frac{7}{9} + \frac{7}{9} + \frac{7}{9} + \frac{7}{9}$$

$$= \frac{28}{9}$$

Perfect Squares...

16

25

9

1

4

144

256

Non-Perfect Squares...

15

8

2

11

20

167

19

$\sqrt{16} = 4$

$\sqrt{8} = 2.8284271\ldots$

Non- perfect Squares cannot be written as a product of two equal numbers

With a Calculator

How do we know if a number is a perfect square using a calculator?

→ When you take the square root on your calculator and it gives you a decimal the ends then it is a perfect square.

$\sqrt{1.25}$

= 1.1180...

Decimal does not end

so

NOT a Perfect Square

$\sqrt{0.81}$

= 0.9

Decimal ends

so

Perfect Square

Without a Calculator

- change your decimal to a fraction

- if you can take the square root of the top and the bottom then the number is a perfect square

Example:

Determine if the decimal is a perfect square?

a) $\sqrt{0.25}$

$\sqrt{\frac{25}{100}}$

$\frac{5}{10}$

0.25 is

Perfect Square

b) $\sqrt{2.5}$

$\sqrt{\frac{25}{10}}$

$\frac{5}{?}$

2.5 is NOT a

Perfect Squa

c) $\sqrt{1.69}$

$\sqrt{\frac{169}{100}}$

$\frac{13}{10}$

1.69 is

Perfect Square

Estimate the square root of 7.5.

Method #1	Method #2
With Calculator:	Without Calculator:
	Using Benchmarks:

$\sqrt{7.5} = 2.73861.$

3.5 away

$\sqrt{4}$ $\sqrt{7.5} =$ 1.5 away $\sqrt{9}$

2 3

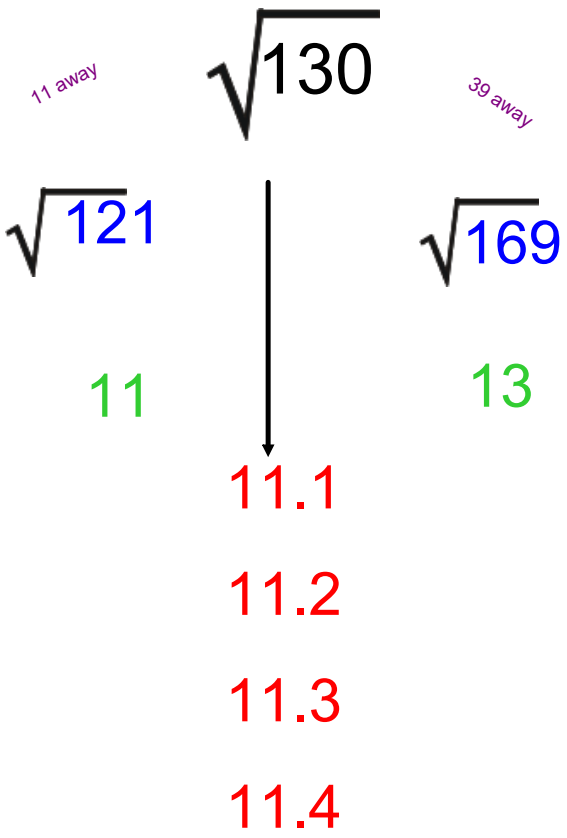
2.6

2.7

2.8

2.9

Estimate the square root of 130



Find a number that has a square root between 10 and 11.

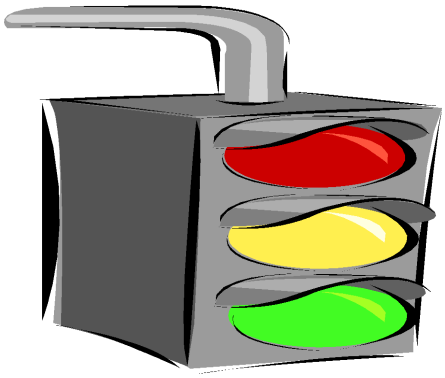
$\sqrt{x} = 10$

$x = 100$

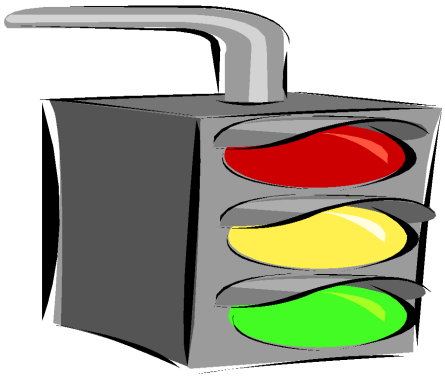
$\sqrt{y} = 11$

$y = 121$

$\sqrt{115} = 10.72$



Now it is time for Home Learning



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Questions:

3abc, 5aceg, 7acegi, 8abcd, 9aceg, 10abcd, 14, 16

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Questions:

7, 9, 10abcd, 17