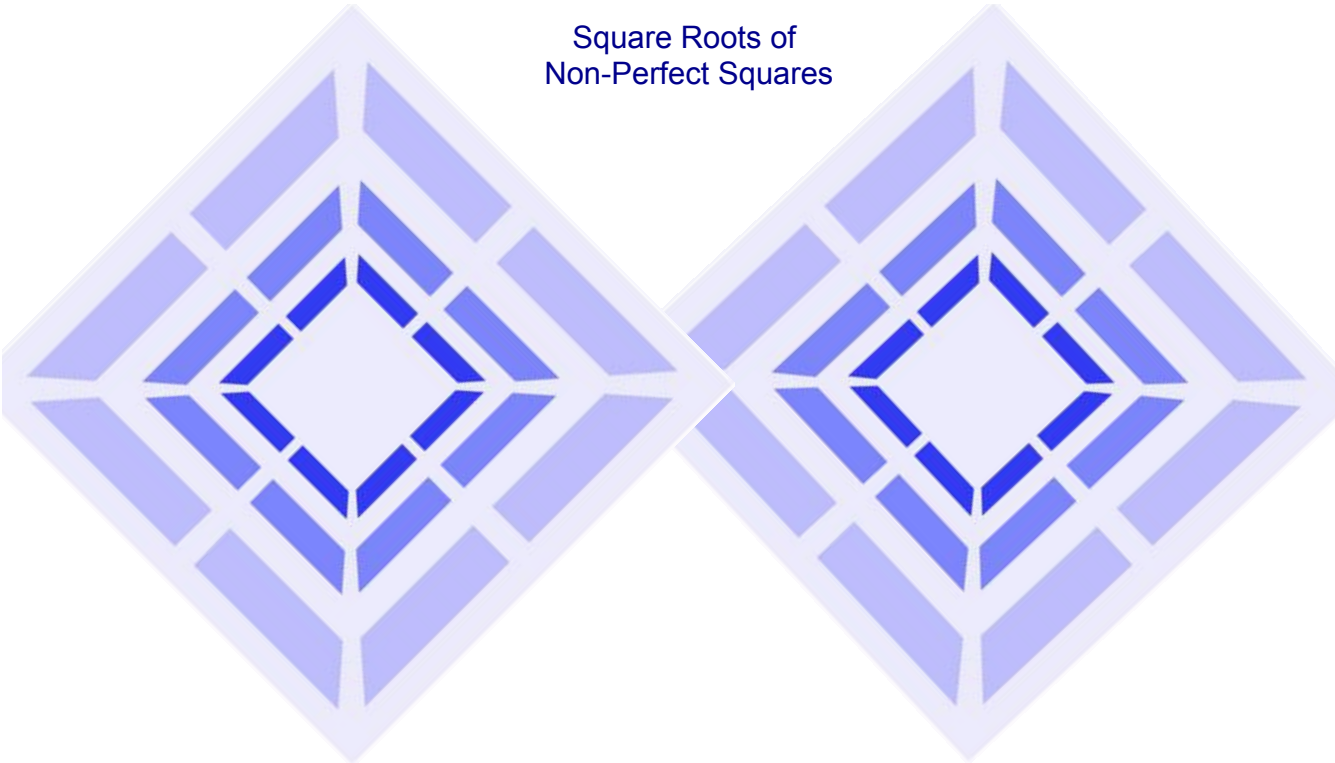
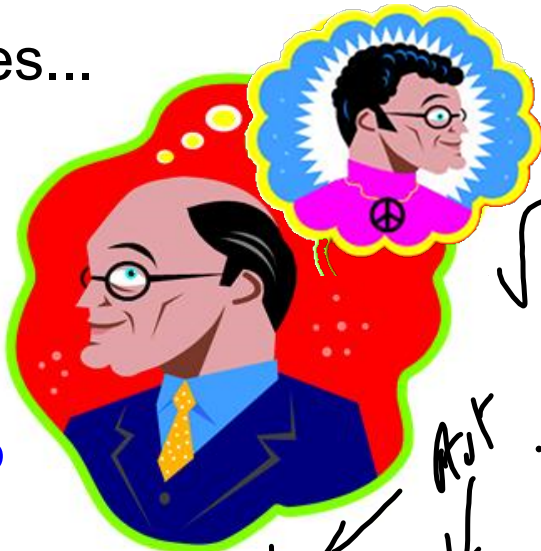


Square Roots of  
Non-Perfect Squares



Perfect Squares...

16  
 1 25 9  
 144 4 256



Non-Perfect Squares...

$\sqrt{8}$  15  
 2 11  
 20 167  
 . 19

$\sqrt{16} = \underline{4}$

*terminate  
or  
repeat.*

$\sqrt{8} = 2.8284271\overline{\dots}$

## Estimating square roots of non-perfect squares.



Estimate the square root of 7.5.

**Method #1**

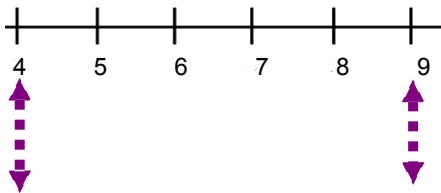
**Method #2**

Using Benchmarks:

Using a Calculator:

Determine what two perfect squares 7.5 is between.

$$\sqrt{7.5} =$$



$$\sqrt{7.5} \doteq$$

Then estimate the square root of 7.5.

If the answer does not appear to terminate (stop) or repeat, estimate the answer by rounding to the tenths place.

Estimate the square root of  $\frac{3}{7}$ .

**Method #1**

1. Find the perfect squares closest to the numerator and denominator.

$$\sqrt{\frac{3}{7}} \doteq \sqrt{\frac{\quad}{\quad}}$$

2. Take the square roots of the numbers you have chosen.

$$\sqrt{\quad} \doteq \sqrt{\quad}$$

**Method #2**

1. Change the fraction to a decimal, then using benchmarks or a calculator estimate the square root.

$$\sqrt{\frac{3}{7}} = \sqrt{\quad}$$

2. Using benchmarks or a calculator estimate the square root.

Finding a Number with a Square Root **between Two Given Numbers.**

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



Method #1

Identify the perfect squares first.



Choose  
any number  
between them...  
and find  
the square root.

$$\sqrt{115} \approx 10.7$$

Method #2

Identify any decimal first.



Now square the number.  
 $(10.4)^2 = 108.16$



Please try  
questions  
4 to 12  
on pages  
18 and 19.

*ENJOY!*

1  
 4  
 9  
 16  
 25  
 36  
 49  
 64  
 81  
 100

5 a)  $\sqrt{\frac{5}{10}} = \sqrt{0.50} = 0.71$   
 $\sqrt{0.49} = 0.7$      $\sqrt{0.64} = 0.8$

(7)     $\sqrt{4.5}$   
           ↓  
           2    2.1  
                   2.2

$\sqrt{4}$      $\sqrt{9}$   
 2    3

10)  $\sqrt{3}$  and  $\sqrt{4}$

$\sqrt{9}$        $\sqrt{16}$        $9 - 16$

$\frac{3.31}{3.60}$        $\parallel$        $\parallel$

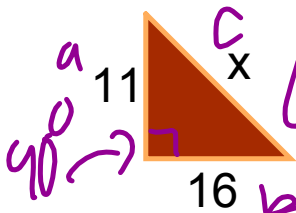
$\sqrt{13}$



1.  
4  
9  
16  
25  
36  
49  
64  
81  
100

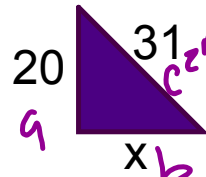
$\sqrt{1} = 1$   
 $\sqrt{4} = 2$   
 $\sqrt{3.5}$   
 $\sqrt{10}$   
 $\sqrt{12}$   
9-16.  
16.  
1.7  
3  
4

Pythagorean Theorem (use it only for



hypotenuse

Find the value of x.



right angle triangle

$$c^2 = a^2 + b^2$$

c is always hypotenuse.

$$c^2 = 11^2 + 16^2$$

$$c^2 = 121 + 256$$

$$\sqrt{c^2} = \sqrt{377}$$

$$c = 19.4$$

$$c^2 = a^2 + b^2$$

$$31^2 = 20^2 + b^2$$

$$31^2 = 20^2 + b^2$$


$$31^2 - 20^2 = b^2$$

$$961 - 400 = b^2$$

$$\sqrt{561} = \sqrt{b^2}$$

$$23.7 = b$$

$$b = 23.7$$

\*  $C^2 = a^2 + b^2$      3 

$5^2 = 3^2 + b^2$

$25 = 9 + b^2$

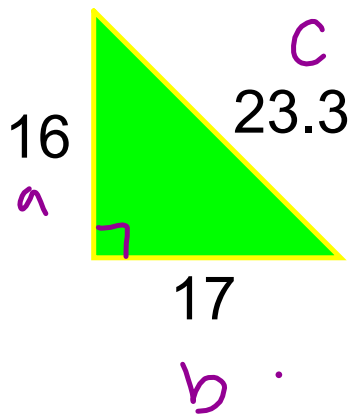
$b^2 = 25 - 9$

$b^2 = 16$

$\sqrt{b^2} = \sqrt{16}$

$b = 4$

Is this a right angled triangle?



$$c^2 = a^2 + b^2$$

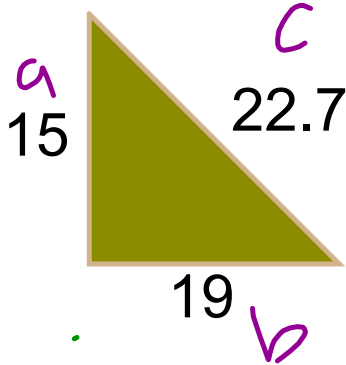
$$23.3^2 = 16^2 + 17^2$$

$$542.89 = 256 + 289$$

$$542.89 \neq 545$$

Not a right  
angled triangle.

Is this a right angled triangle?



$$c^2 = a^2 + b^2$$

$$22.7^2 = 15^2 + 19^2$$

$$515.29 = 225 + 361$$

$$515.29 \neq 586$$

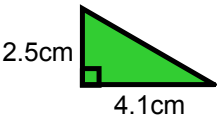
Not a Right angle triangle.

$$c^2 = a^2 + b^2$$

7-12  
(1-6)  
Yes

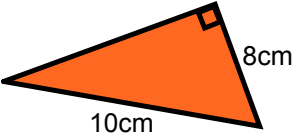
no.

Determine the unknown length.



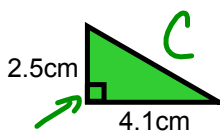
$$c^2 = a^2 + b^2$$

$$c^2 = a^2 + b^2$$



The answers are on the next page.

Determine the unknown length.



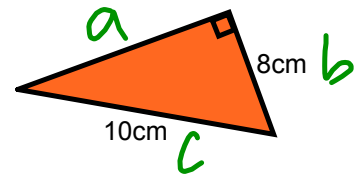
$$c^2 = a^2 + b^2$$

$$c^2 = 2.5^2 + 4.1^2$$

$$c^2 = 6.25 + 16.81$$

$$c^2 = \sqrt{23.06}$$

$$c = 4.8\text{cm}$$



$$c^2 = a^2 + b^2$$

$$10^2 = a^2 + 8^2$$

$$100 = a^2 + 64$$

$$100 - 64 = a^2$$

$$\sqrt{36} = \sqrt{a^2}$$

$$6\text{cm} = a$$



# Real Life Square Roots!!



A ladder is 6.1m long. The distance from the base of the ladder to the wall is 1.5m. Estimate how far up the wall the ladder will reach.

$$c^2 = a^2 + b^2$$

This looks familiar! Scratch my head for me.



$$6.1^2 = a^2 + 1.5^2$$

$$37.21 = a^2 + 2.25$$

$$a^2 = 37.21 - 2.25$$

$$\sqrt{a^2} = \sqrt{34.96}$$

$$a = 5.91$$

How much non-slip coating will this ramp need?



Do you have all the information needed to answer this question?

