Name: _____   Date: _____   Period: _____

Vocabulary: The following examples explain concepts that you should familiarize yourself with.

Squared: a number multiplied by itself.

Examples: 4^2 means 4 squared. To calculate, multiply 4 times 4 = 16

8^2 means 8 squared. To calculate, multiply 8 times 8 = 64

Square Root (RADICAL):   A number that produces a quantity when multiplied by itself. The symbol for the square root is the radical sign, $\sqrt{\#}$.

Examples: $\sqrt{9} = \sqrt{3 \cdot 3}$, so $\sqrt{9} = 3$

$\sqrt{49} = \sqrt{7 \cdot 7}$, so $\sqrt{49} = 7$

** SPECIAL NOTE: Square Root is the **OPPOSITE** operation of Squared.

Perfect Square: a number made by **squaring** a whole number.

Examples: 16 is a perfect square because 4^2 is equal to 16

81 is a perfect square because 9^2 is equal to 81

A non-perfect square under the radical sign is an IRRATIONAL #

Example: $\sqrt{12}$ Is IRRATIONAL because 12 is not a perfect square.

$\sqrt{48}$ Is IRRATIONAL because 48 is not a perfect square.

Complete the table listing the perfect squares of the numbers through 20 x 20…. the first 3 have been started for you.

#	# x itself	Perfect Square	#	# x itself	Perfect Square	#	# x itself	Perfect Square	#	# x itself	Perfect Square
1	1 x 1	**1**	6	6 x 6		11	11 x 11		16	16 x 16	
2	2 x 2	**4**	7	7 x 7		12	12 x 12		17	17 x 17	
3	3 x 3	**9**	8	8 x 8		13	13 x 13		18	18 x 18	
4	4 x 4		9	9 x 9		14	14 x 14		19	19 x 19	
5	5 x 5		10	10 x 10		15	15 x 15		20	20 x 20	

Please answer the following questions.

1.   Is 48 a perfect square?

Why or why not?

_____

_____

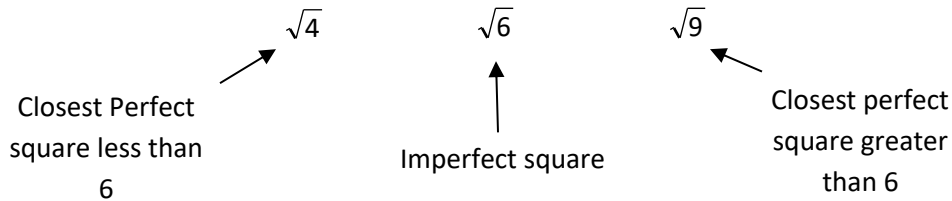2.   Is the table above a COMPLETE list of perfect squares?

Why or why not?

_____

_____

3.   What is $\sqrt{625}$?
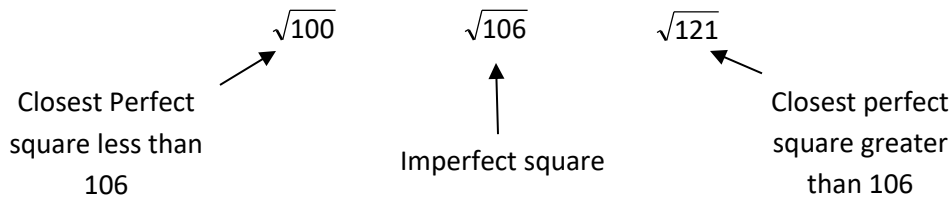
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Estimating Radicals

When a number under the radical ($\sqrt{\#}$) is NOT a perfect square, we can ESTIMATE around what # it is. To figure out what whole #s an imperfect square is in between, find the nearest two perfect squares. Take the square root of each and those are the two #s that the imperfect square falls between.

Example: Between which two #s is $\sqrt{6}$ between?

$$\sqrt{4} \qquad \sqrt{6} \qquad \sqrt{9}$$

Closest Perfect square less than 6

Imperfect square

Closest perfect square greater than 6

Since the $\sqrt{4}$ = 2 and $\sqrt{9}$ = 3, $\sqrt{6}$ falls between 2 and 3. It would be closer to 2 because 4 is closer to 6 than 9 is.

Example: Between which two #s is $\sqrt{106}$ between?

$$\sqrt{100} \qquad \sqrt{106} \qquad \sqrt{121}$$

Closest Perfect square less than 106

Imperfect square

Closest perfect square greater than 106

Since the $\sqrt{100}$ = 10 and $\sqrt{121}$ = 11, $\sqrt{106}$ falls between 10 and 11. It would be closer to 10 because 100 is closer to 106 than 121 is.

Try these:

1. The expression $\sqrt{41}$ is a number between

_____ and _____
Closer to _____

2. The expression $\sqrt{67}$ is a number between

_____ and _____
Closer to _____

3. The expression $\sqrt{96}$ is a number between

_____ and _____
Closer to _____

4. The expression $\sqrt{19}$ is a number between

_____ and _____
Closer to _____

5. The expression $\sqrt{8}$ is a number between

_____ and _____
Closer to _____

6. The expression $\sqrt{210}$ is a number between

_____ and _____
Closer to _____

Rational or Irrational?

1. $\sqrt{4}$ Rational   or   Irrational

2. $\sqrt{144}$ Rational   or   Irrational

3. .25   Rational   or   Irrational

4. $\sqrt{12}$ Rational   or   Irrational

5. $\sqrt{81}$ Rational   or   Irrational

6. $\sqrt{27}$ Rational   or   Irrational

Radical Notes