



Unit 1

The Number System

Interactive Notebook

**Approximating
Non-Perfect Squares**

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The Number System
(Approximating Non-Perfect Squares)

I can _____

Vocab:

What is a non-perfect square?

Approximating Non-Perfect Squares:

I know that $\sqrt{8}$ is between _____ and _____.

So, my guess is that $\sqrt{8}$ is approximately _____.

Now, I can use the following steps to make sure my guess is more accurate:

Example:

Step 1:

Step 2:

Step 3:

Step 4:

Step 5:

YOUR TURN

The Number System

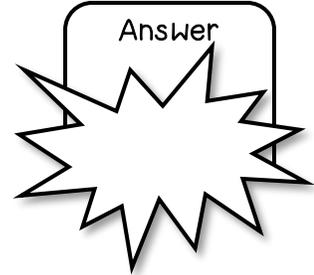
(Approximating
Non-Perfect Squares)

On a rating of 1-5, how comfortable
are you with this concept?
(5 is the highest)

1 2 3 4 5

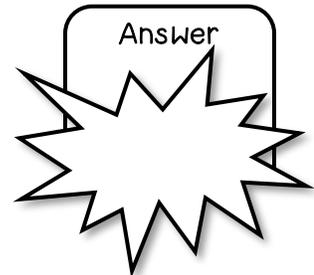
1.) $\sqrt{12} \approx$

Answer



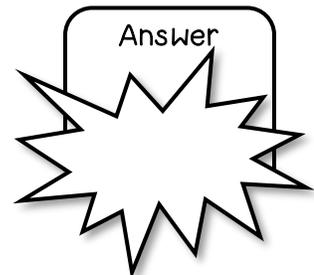
2.) $\sqrt{20} \approx$

Answer



3.) $\sqrt{85} \approx$

Answer



Reflection: I learned...

The Number System

(Approximating Non-Perfect Squares)

Vocab:

What is a non-perfect square?

A non-perfect square has a square root that is not an integer.

I can approximate a non-perfect square by looking at perfect squares it is between.

Approximating Non-Perfect Squares:

I know that $\sqrt{8}$ is between $\sqrt{4}$ and $\sqrt{9}$.

So, my guess is that $\sqrt{8}$ is approximately 2.8.

Now, I can use the following steps to make sure my guess is more accurate:

Step 1:

Determine the two perfect squares that the non-perfect square is between.

Step 2:

Take the number inside of the square root and divide it by the square root of the first number.

Step 3:

Take the average of your answer and the number that you divided by.

Step 4:

Take the number inside of the square root and divide it by your average.

Step 5:

Take the average of the answers from step 3 and step 4.

Example:

$\sqrt{8}$

Between $\sqrt{4}$ and $\sqrt{9}$

$$\frac{8}{2} = 4$$

$$\frac{(4+2)}{2} = \frac{6}{2} = 3$$

$$\frac{8}{3} = 2.6$$

$$\frac{(2.6 + 3)}{2} = 2.83$$
$$\approx 2.8$$

YOUR TURN

The Number System

(Approximating
Non-Perfect Squares)

On a rating of 1-5, how comfortable
are you with this concept?
(5 is the highest)

1 2 3 4 5

1.) $\sqrt{12} \approx 3.5$

Between $\sqrt{9}$ and $\sqrt{16}$ (3 and 4)

$$\frac{12}{3} = 4$$

$$\frac{(4+3)}{2} = 3.5$$

$$\frac{12}{3.5} = 3.42\dots$$

$$\frac{(3.5 + 3.42\dots)}{2} = 3.46\dots \approx 3.5$$

Answer

3.5

2.) $\sqrt{20} \approx 4.5$

Between $\sqrt{16}$ and $\sqrt{25}$ (4 and 5)

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

$$\frac{(5+4)}{2} = 4.5$$

$$\frac{20}{4.5} = 4.\bar{4}$$

$$\frac{(4.5 + 4.\bar{4})}{2} = 4.47\bar{2} \approx 4.5$$

Answer

4.5

3.) $\sqrt{85} \approx 9.2$

Between $\sqrt{81}$ and $\sqrt{100}$ (9 and 10)

$$\frac{85}{9} = 9.\bar{4}$$

$$\frac{(9.\bar{4}+9)}{2} = 9.\bar{2}$$

$$\frac{85}{9.\bar{2}} = 9.21\dots$$

$$\frac{(9.\bar{2} + 9.21\dots)}{2} = 9.219\dots \approx 9.2$$

Answer

9.2

Reflection: I learned...

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