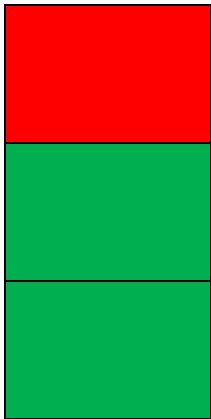Name: _____ Period: _____ Date: _____

Approximating Square Roots

Assignment

Answers:

Part A: Color the box GREEN if the given number is a perfect square and RED if it is not.

1)		99
3)		100
5)		441

2)		−9
4)		81
6)		625

Part B: Find the value of the following.

1) $\pm\sqrt{25} = \pm 5$

2) $\sqrt{-25} = \text{undefined}$

3) $\sqrt{1600} = 40$

4) $\sqrt{121} = 11$

5) $\sqrt{-1} = \text{undefined}$

6) $\pm\sqrt{1} = \pm 1$

7) $\pm\sqrt{196} = \pm 14$

8) $\sqrt{40000} = 200$

9) $\sqrt{225} = 15$

10) $\sqrt{-100} = \text{undefined}$

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Approximating Square Roots

Part C: Find two consecutive integers between which $\sqrt{66}$ lies.

The radicand is 66.

The closest perfect square number

less than 66 is 64.

The closest perfect square number

greater than 66 is 81.

$$\sqrt{64} < \sqrt{66} < \sqrt{81}$$
$$8 < \sqrt{66} < 9$$

The square root of $\sqrt{65}$ is between 8 and 9.

Part D: Find two rational numbers with two decimal places between which $\sqrt{66}$ lies.

Since 66 is between 64 and 81, $\sqrt{66}$ must be between $\sqrt{64}$ and $\sqrt{81}.65\sqrt{64} < \sqrt{66} < \sqrt{81}$
$$8 < \sqrt{66} < 9$$

By estimation, we have:

$8.1^2 = 65.61$ **So, $\sqrt{66}$ lies between 8.1**
$8.2^2 = 67.24$ **and 8.2.**

To find the two rational numbers with two decimal places between which $\sqrt{66}$ lies, let's estimate further:

$8.11^2 = 65.7721$
$8.12^2 = 65.9344$ **So, $\sqrt{5}$ lies between 8.12**
$8.13^2 = 66.0969$ **and 8.13.**

The square root of $\sqrt{66}$ is between

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Approximating Square Roots

Assignment

Part E: Approximate √66 up to the fourth estimate.

Since 66 is between 64 and 81, √66 must be between √64 and √81.

$$\sqrt{64} < \sqrt{66} < \sqrt{81}$$

$$8 < \sqrt{66} < 9$$

Step 1: The integer closest to √66 is 8.

The first estimate is 8.

Step 2: Divide the radicand by the first estimate.

$$66 \div 8 = 8.25$$

Step 3: To find the second estimate, find the average of the quotient in Step 2 and the first estimate.

$$\frac{8.25 + 8}{2} = \frac{16.25}{2} = 8.125$$

The second estimate is 8.125.

Step 4: Repeat Step 2. But this time, divide the radicand by the second estimate.

$$66 \div 8.125 \approx 8.123$$

Step 5: To find the third estimate, repeat Step 3. This time, find the average of the quotient in Step 4 and the second estimate.

$$\frac{8.123 + 8.125}{2} = \frac{16.248}{2} = 8.124$$

The third estimate is 8.124.

Approximating Square Roots

Step 6: Repeat Step 2. But this time, divide the radicand by the third estimate.

$$66 \div 8.124 \approx 8.124$$

Step 5: To find the fourth estimate, repeat Step 3. This time, find the average of the quotient in Step 4 and the third estimate.

$$\frac{8.123 + 8.124}{2} = \frac{16.247}{2} = 8.1235$$

The closest approximate of $\sqrt{66}$ is 8.1235.