**Answers:**

**Part A:** Find the value of the following.

|  |  |
| --- | --- |
| 1) $\pm \sqrt{36}=\pm 6$ | 2) $\sqrt{-4} undefined$  |
| 3) $\sqrt{900}=30$ | 4) $\pm \sqrt{169}=\pm 13$ |

**Part B:** Find two consecutive integers between $\sqrt{46 }$lies.

Solution:

The radicand is 45.

The closest perfect square number

less than 46 is 36.

The closest perfect square number

greater than 46 is 49.

$$\sqrt{36}<\sqrt{46}<\sqrt{49}$$

$$6<\sqrt{46}<7$$

The square root of $\sqrt{46}$ is between 6 and 7.

**Part C:** Determine two rational numbers with two decimal places between which $\sqrt{46 } $lies.

Solution:

Since 45 is between 36 and 49, $\sqrt{46}$ must be between $\sqrt{36}$ and $\sqrt{49.}$

$$\sqrt{36}<\sqrt{46}<\sqrt{49}$$

$$6<\sqrt{46}<7$$

By estimation, we have:

**So,** $\sqrt{46}$ **lies between 6.7 and 6.8.**

|  |
| --- |
| $$6.1^{2}=37.21$$ |
| $$6.2^{2}=38.44$$ |
| $$6.3^{2}=39.69$$ |
| $$6.4^{2}=40 .96$$ |
| $$6.5^{2}=42 .25$$ |
| $$6.6^{2}=43 .56$$ |
| $$6.7^{2}=44 .89$$ |
| $$6.8^{2}=46 .24$$ |

To find the two rational numbers with two decimal places between which $\sqrt{46}$ lies, let’s estimate further:

**So,** $\sqrt{46}$ **lies between 6.78 and 6.79.**

|  |
| --- |
| $$6.74^{2}=45.4276$$ |
| $$6.75^{2}=45 .5625$$ |
| $$6.76^{2}=45 .6976$$ |
| $$6.77^{2}=45 .8329$$ |
| $$6.78^{2}=45.9684$$ |
| $$6.79^{2}=46 .1041$$ |

The square root of $\sqrt{46}$ is between

6.78 and 6.79.

**Part D:** Approximate $\sqrt{46 }$ up to the third estimate by averaging.

Solution:

Since 46 is between 46 and 49, $\sqrt{46}$ must be between $\sqrt{36}$ and $\sqrt{49.}$

$$\sqrt{36}<\sqrt{46}<\sqrt{49}$$

$$6<\sqrt{46}<7$$

Step 1: The integer closest to $\sqrt{46}$ is 7.

The first estimate is 7.

Step 2: Divide the radicand by the first estimate.

$$46÷7≈6.57$$

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

$$\frac{6.57+7}{2}=\frac{13.57}{2}=6.785$$

The second estimate is 6.785.

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

$$46÷6.785≈6.78$$

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.

$$\frac{6.78+6.785}{2}=\frac{13.565}{2}=6.7825$$

The closest approximate of $\sqrt{46 } $is 6.7825.