Name Key

Mrs. Roumbos

Date _____

Period _____

Estimating the Value of Expressions

To estimate the value of an expression with an irrational number, substitute the irrational number with its approximate decimal value, the **nearest hundredth**. Then continue to solve the expression according to the order of operations.

→ 2 places after the decimal point

Tenth Hundredth

→ PEMDAS

Problem: ( ) x^2 a/b ÷ +/−

The following table lists 9 common irrational numbers, with their decimal approximations to the hundredths.

Irrational Number	Approximation
$\sqrt{2}$	1.41
$\sqrt{3}$	1.73
$\sqrt{5}$	2.24
$\sqrt{6}$	2.45
$\sqrt{7}$	2.65

Irrational Number	Approximation
$\sqrt{8}$	2.83
π	3.14
$\sqrt{10}$	3.16
$\sqrt{11}$	3.32

- **Example**

  Approximate $\sqrt{3} + \sqrt{6}$

  The approximate value of $\sqrt{3}$ is 1.73. The approximate value of $\sqrt{6}$ is 2.45.

  1.73 + 2.45 = 4.18

  Therefore, $\sqrt{3} + \sqrt{6} \approx 4.18$

- **Example**

  Approximate π^2

  The approximate value of π is 3.14.

  $3.14^2 = 3.14 \times 3.14 = 9.8596$

  Therefore, $\pi^2 \approx 9.86$

Practice

Directions: For questions 1 through 8, find the approximate values of the given expressions, to the nearest hundredth.

1. $\pi - \sqrt{20}$

$3.14 - 4.47 =$

-1.33

5. $10\sqrt{6} - 4\sqrt{3}$

$24.49 - 6.93 =$

17.56

2. $\sqrt{3} - \sqrt{2}$

$1.73 - 1.41 =$

0.32

6. $\sqrt{11} - \sqrt{10}$

$3.32 - 3.16 =$

0.16

3. $\sqrt{8} \cdot \pi$

$2.83 \cdot 3.14 = 8.8862$ ★Round at the end

8.89

7. $\sqrt{7} \cdot \frac{2}{5}$ → must use ÷ or 2nd (PRB) for fraction

$2.65 \cdot 0.40 =$

1.06

4. $\sqrt{5} + \sqrt{6} + \sqrt{7}$

$2.24 + 2.45 + 2.65 =$

7.34

★ 8. $\sqrt{2} + \sqrt{10} \cdot \pi$ (PEMDAS)

$1.41 + 3.16 \cdot 3.14$

$1.41 + 9.9224 = 11.3324$ ★Round at the end

★multiply 10

11.33

9. The length of the diagonal in quadrilateral A is $5\sqrt{3}$. The length of the diagonal in quadrilateral B is $8\sqrt{2}$. The length of the diagonal in quadrilateral C is $3\sqrt{12}$. What is the approximate sum of the lengths of the diagonals of quadrilaterals A, B, and C?

$5\sqrt{3} + 8\sqrt{2} + 3\sqrt{12}$

$8.66 + 11.31 + 10.39 = 30.36$