Name: KEY

Topic: **10.3 Finding and Estimating Square Roots** Date:____________ Block: ____

List as many perfect squares as possible (for example 25 is a perfect square):

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

121, 144, 169, 196, 225 → *must have through 15^2 memorized

Square Root: $\sqrt{}$

a is a square root of b if $a^2 = b$

Radicand:

expression under the radical sign

Examples: (take sign in front)

1. $\sqrt{4}$

   2

2. $-\sqrt{144}$

   -12

3. $\pm\sqrt{196}$

   ± 14

4. $\sqrt{169}$

   13

5. $-\sqrt{81}$

   -9

6. $\sqrt{121}$

   11

7. $\sqrt{\frac{9}{100}} = \frac{\sqrt{9}}{\sqrt{100}}$

   $\frac{3}{10}$

8. $\pm\sqrt{\frac{49}{25}} = \frac{\sqrt{49}}{\sqrt{25}}$

   $\pm\frac{7}{5}$

9. $\sqrt{\frac{144}{81}} = \frac{\sqrt{144}}{\sqrt{81}}$

   $\frac{12}{9} = \frac{4}{3}$

Irrational VS Rational:

Place the following numbers in the appropriate circle: $\frac{1}{7}$, 9, π, 2.25, $\bar{3}$, -6

decimal does not end or repeat in pattern ← Irrational

π

-any $\sqrt{}$ that is not a perfect square

Rational → can be written as fraction $\left(\frac{a}{b}\right)$

- decimal ends or repeats in pattern

$\frac{1}{7}$ 9

2.25

$.\bar{3}$

-6

$\sqrt{}$ that are perfect squares

Examples: Tell whether each expression is rational or irrational.

a) $\sqrt{25} = 5$

R

b) $\pm\sqrt{\frac{9}{25}} = \pm \frac{3}{5}$

R

c) $-\sqrt{64} = -8$

R

d) $\sqrt{\frac{1}{9}} = \frac{1}{3}$

R

e) $\sqrt{7}$

I

f) $-\sqrt{75}$

I

Examples: Between what two consecutive integers is each square root? Then use a calculator to find each square root to the nearest hundredth.

a) $\sqrt{28.34}$

between $\sqrt{25}$ & $\sqrt{36}$

5 & 6

5.32 by calculator

b) $\sqrt{12.54}$

between $\sqrt{9}$ & $\sqrt{16}$

3 & 4

3.54

c) $\sqrt{75.23}$ $\sqrt{64}$ & $\sqrt{81}$

8 & 9

8.67

d) $\sqrt{50}$ $\sqrt{49}$ & $\sqrt{64}$

7 & 8

7.07

Example: The formula $d = \sqrt{x^2 + (3x)^2}$ gives the length of the diagonal of a rectangular field that has a length three times its width x. Find the length of the diagonal if x = 8 feet.

$8^2 + (3 \cdot 8)^2$

$64 + 576 = \sqrt{640}$

$\boxed{22.3 \text{ ft.}}$