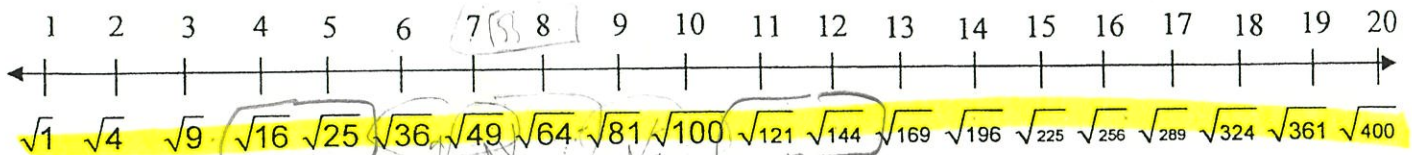


Estimating Square Roots
Day 1



I. Definitions:

1) Perfect Squares- a # whose square root is an integer

ex. $\sqrt{9} = 3$
perfect square

2) Square Roots- a # that is multiplied by itself to form a product ex. $\sqrt{25} = 5$
square root

3) Integers- positive + negative whole #'s
(No decimals or fractions)

The square root of a number is between two consecutive integers. (The numbers may not always be perfect squares, they may be irrational ex: $\sqrt{7}$, $\sqrt{23}$)

III. Estimating the square root of a non-perfect square

A) Between which 2 whole numbers

Steps: 1) List the Perfect Squares

2) Find the two consecutive perfect squares that the irrational number is in between.

3) Set up an inequality.

4) Find the square roots of those perfect squares

check on calc

B) Ex's: Find which two whole numbers the root is in between.

1) $\sqrt{55}$
 $\sqrt{49} < \sqrt{55} < \sqrt{64}$
 $7 < \sqrt{55} < 8$

2) $\sqrt{43}$
 $\sqrt{36} < \sqrt{43} < \sqrt{49}$
 $6 < \sqrt{43} < 7$

3) $\sqrt{87}$
 $\sqrt{81} < \sqrt{87} < \sqrt{100}$
 $9 < \sqrt{87} < 10$

4) $\sqrt{190}$
 $\sqrt{169} < \sqrt{190} < \sqrt{196}$
 $13 < \sqrt{190} < 14$

$\sqrt{55}$ is between 7 + 8

$\sqrt{43}$ is between 6 + 7

$\sqrt{87}$ is between 9 + 10

$\sqrt{190}$ is between 13 + 14

C) To the nearest whole number

Steps: 1) Follow steps 1-3 from above

2) Find the difference from the irrational root to the smaller square root and the irrational root to the larger root

3) The smaller difference will show which perfect square the irrational square root is closer to and therefore the closer square root (whole number) it is closer to.

★ Can check on calc

D) Ex's: Find which whole number the root is closer to.

1) $\sqrt{18}$

$$\sqrt{16} < \sqrt{18} < \sqrt{25}$$

$$4 < \sqrt{18} < 5$$

18 -16 ----- 2		25 -18 ----- 7
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$\sqrt{18}$ is between 4 + 5 and closer to 4

2) $\sqrt{139}$

$$\sqrt{121} < \sqrt{139} < \sqrt{144}$$

$$11 < \sqrt{139} < 12$$

139 -121 ----- 18		144 -139 ----- 5
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$\sqrt{139}$ is between 11 + 12 and closer to 12

3) $\sqrt{75}$

$$\sqrt{64} < \sqrt{75} < \sqrt{81}$$

$$8 < \sqrt{75} < 9$$

75 -64 ----- 11		81 -75 ----- 6
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$\sqrt{75}$ is between 8 + 9 and closer to 9

4) $\sqrt{45}$

$$\sqrt{36} < \sqrt{45} < \sqrt{49}$$

$$6 < \sqrt{45} < 7$$

45 -36 ----- 9		49 -45 ----- 4
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$\sqrt{45}$ is between 6 + 7 and closer to 7

E) Word Problems

6) While searching for a lost hiker, a helicopter covers a square area of 150 miles.



What is the approximate length of each side of the square area?

Round to the nearest mile. (nearest whole #)

$\sqrt{\text{Area}} = \text{Side}^2$
 $\sqrt{A} = S$

$$\sqrt{144} < \sqrt{150} < \sqrt{169}$$

$$12 < \sqrt{150} < 13$$

150 -144 ----- 6		169 -150 ----- 19
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Each side of the square is ≈ 12 mi

7) A tent was advertised in the newspaper as having an enclosed square area of 98ft. What is the approximate length of the sides of the square area? Round to the nearest foot.

$$\sqrt{81} < \sqrt{98} < \sqrt{100}$$

$$9 < \sqrt{98} < 10$$

98 -81 ----- 17		100 -98 ----- 2
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Each side of the square is ≈ 10 ft long