NOVEMBER 9, 2015

**UNIT 3:   SQUARE ROOTS AND
             SURFACE AREA**

**SECTION 1.2:
SQUARE ROOTS OF
NON-PERFECT SQUARES**

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MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Numbers 4" OR N4 and begin working on "Numbers 6" OR "N6" which state:

N4:   **"Explain and apply the order of operations, including exponents, with and without technology."**

N6:   **"Determine an approximate square root of positive rational numbers that are non-perfect squares."**

What does THAT mean???

For this unit, SCO N4 means that we will learn how to find the square root (the number that was multiplied by itself) of numbers both with and <u>without</u> a calculator.
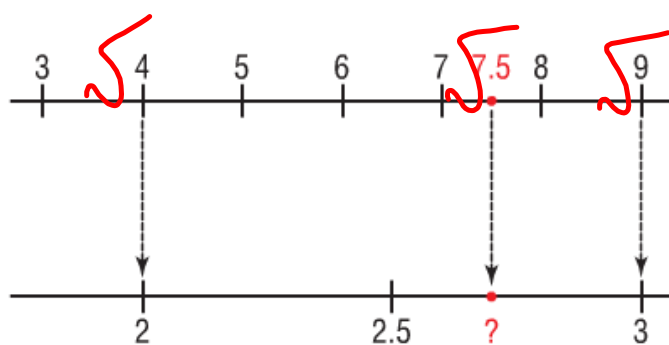
SCO N6 means that we will use calculators and "benchmarking" to <u>estimate</u> the square root (the number that was multiplied by itself) of non-perfect squares like 15, 7.5 and $\frac{19}{6}$.

We will learn two strategies for estimating the square root of a decimal number that is not a perfect square:
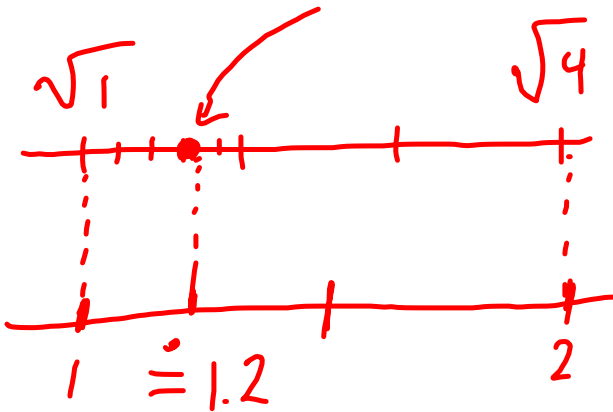
1) benchmarks

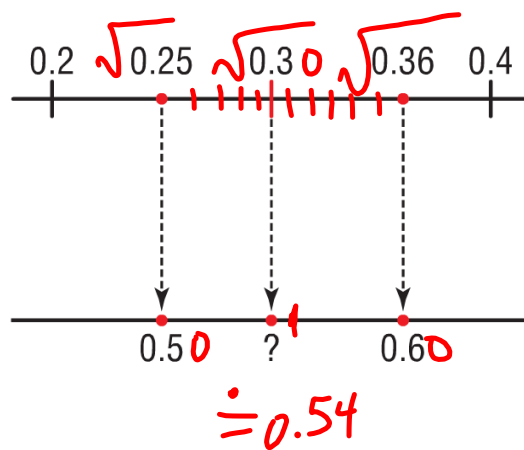**2) using a calculator**

BENCHMARKS: Estimate $\sqrt{7.5}$.

$\doteq 2.7/2.8$

a) $\sqrt{8/5}$
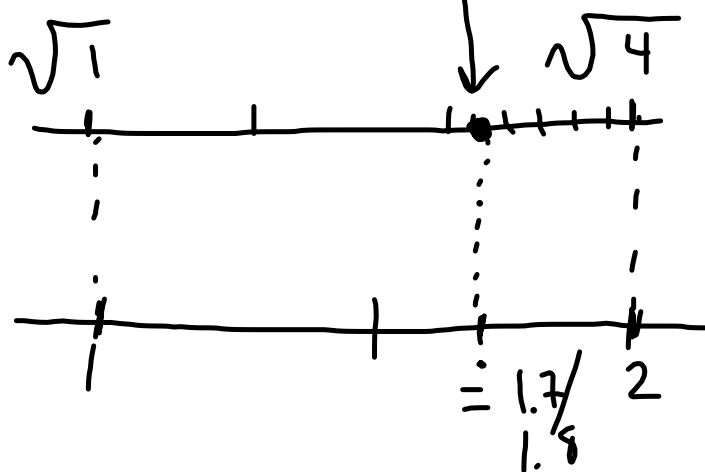
$$= \sqrt{1\frac{3}{5}}$$

$\sqrt{1}$ $\sqrt{4}$

1 $\doteq 1.2$ 2

b) $\sqrt{3/10}$

$$= \sqrt{0.30}$$

0.2 $\sqrt{0.25}$ $\sqrt{0.30}$ $\sqrt{0.36}$ 0.4

0.50   ?   0.60

$\doteq 0.54$

c) $\sqrt{19/6}$

$= \sqrt{3\frac{1}{6}}$

$\sqrt{1}$ $\sqrt{4}$

$\doteq 1.7/$
1.8 2

WARM-UP: Benchmark the square root of 59/2.

$$\sqrt{\frac{59}{2}}$$

$$= \sqrt{29\tfrac{1}{2}}$$

$\sqrt{25}$ $\sqrt{36}$

5 $\doteq 5.4$ 6

$$\sqrt{\frac{7}{10}}$$

$$= \sqrt{0.70}$$

$\sqrt{0.64}$ $\sqrt{0.70}$ $\sqrt{0.81}$

0.8 $\doteq 0.84$ 0.9
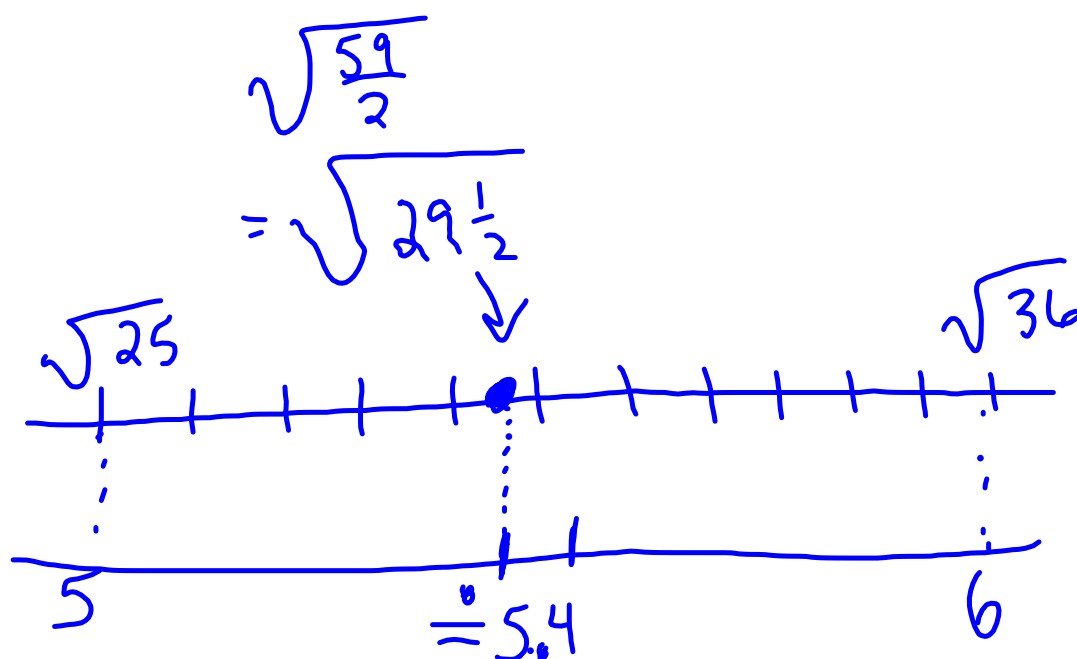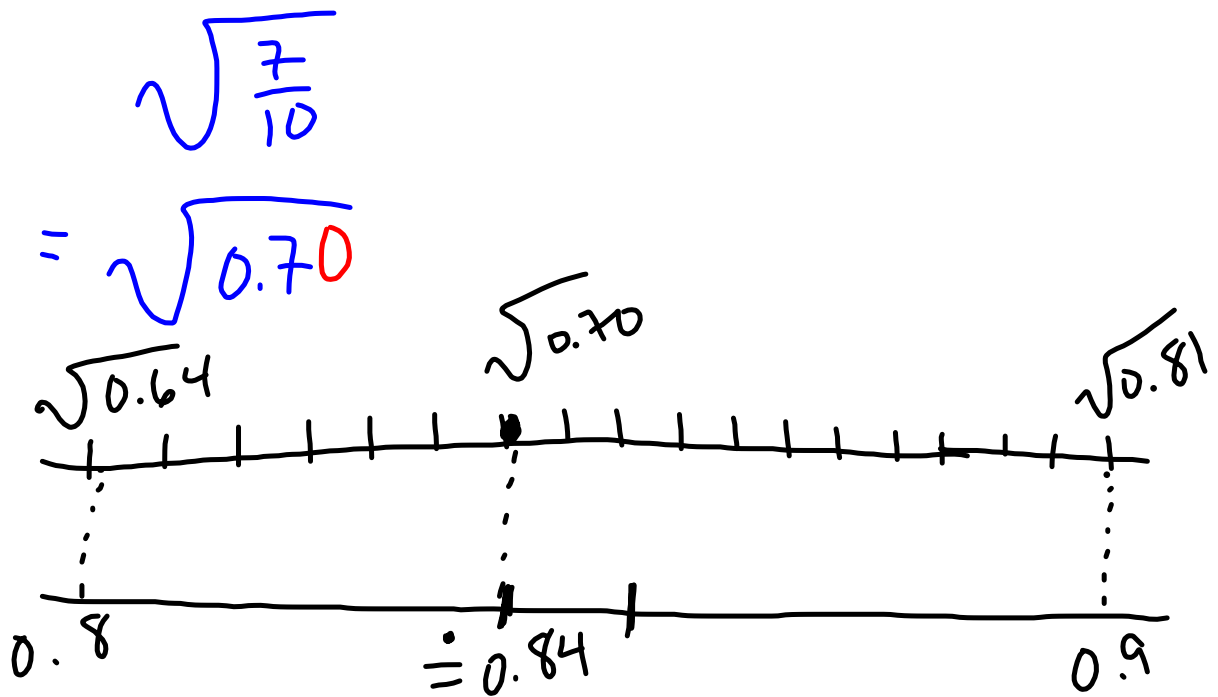
HOMEWORK QUESTIONS?
(pages 18 / 19, #4, #7 and #13)

13. c) $\quad a^2 + b^2 = c^2$

$2.8^2 + b^2 = 5.6^2$

$7.84 + b^2 = 31.36$

$\sqrt{b^2} = \sqrt{31.36 - 7.84}$

$b = \sqrt{23.52}$

$b \doteq 4.8 \text{ cm}$

USING A CALCULATOR: Estimate $\sqrt{7.5}$.

$$\sqrt{7.5} \doteq 2.738\ 612\ 788$$

Check: $2.738\ 612\ 788^2$
            $= 7.500\ 000\ 003$

Since this number is not EXACTLY equal to 7.5, the square root is an approximation.

Let's look at the example on page 17 of *MMS9* for finding a number with a square root between two given numbers:

Identify a decimal number that has a square root between 10 and 11. Check the answer.

Method 1:

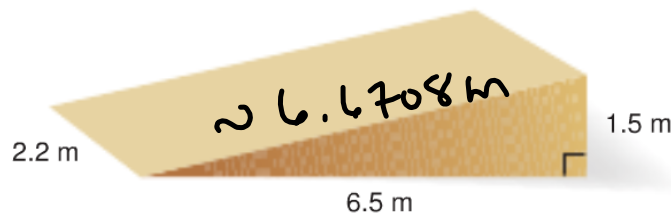**Method 2:**

$$10^2 \quad = \quad 100$$
$$11^2 \quad = \quad 121$$

(10.4)

$\sqrt{108.16}$

One decimal number between 10 and 11 is 10.4 .

Any number between 100

and 121 has a square root

between 10 and 11.

Let's practice some more with the Pythagorean Theorem. Calculate the area of carpet needed to cover this ramp.

$\sim 6.6708\,m$

2.2 m

1.5 m

6.5 m

$$a^2 + b^2 = c^2$$
$$6.5^2 + 1.5^2 = c^2$$
$$42.25 + 2.25 = c^2$$
$$\sqrt{44.5} = \sqrt{c^2}$$
$$6.6708 \doteq c$$

$$A = bh$$
$$\doteq 2.2(6.6708)$$
$$\doteq 14.6758$$
$$\doteq 14.7\,m^2$$

CONCEPT REINFORCEMENT:

(Please try to do these questions <u>without</u> a calculator except #20!)

MMS9
Page 18:   #5 (change to decimal numbers first) and #6abd
Page 19:   #10 and #12cd
Page 20:   #20 (use a calculator)