

# Warm-Up

Nov. 7

A.  $\frac{3}{6} \times \frac{3}{6} = \frac{9}{36}$

$(\frac{3}{6})^2$

Square root  $\frac{\sqrt{9}}{\sqrt{36}} = \frac{3}{6}$

B. Which of the following are perfect squares? [show your work]

$\frac{8}{32} = \frac{1}{4}$   
*NO Put in lowest terms*  
*yes 1x1*  
*2x2*

$\frac{24}{36}$   
*no*  
*yes*

$\frac{2}{3}$   
*NO*  
*no*  
*no*

C. Is the following a perfect square? 1.69  
 Answer using fractions!

$\frac{169}{100}$   
*13x13*  
*yes 10x10*

→ find the square root of 0.09 using fractions

$\frac{\sqrt{9}}{\sqrt{100}} = \frac{3}{10}$

D. What is the number that has a square root of 4?

$\sqrt{?} = 4$   
*16*  
*square the answer to find the unknown number.*

E. What is a number that has a square root of 0.3? [use fractions]

$\sqrt{\frac{9}{100}} = \frac{3}{10}$

Is a number a perfect square?

a)  $\frac{49}{81} \leftarrow \frac{7 \times 7}{9 \times 9}$  b)  $\frac{50}{32}$  No at first then put in lowest terms  
 $\frac{25}{16} \leftarrow \frac{5 \times 5}{4 \times 4}$  yes  
yes

Find the square root?

a)  $0.25 = \frac{\sqrt{25}}{\sqrt{100}} = \frac{5}{10}$

Give a number whose square root

is? a)  $\sqrt{?} = 7$  b)  $\sqrt{?} = 0.9$   $\sqrt{?} = \frac{9}{10}$   
 $\sqrt{49}$   $\frac{81}{100}$   
↑ multiply by itself

**Section 1.2**

**Square Roots of Non-Perfect Squares**

A. List the first five perfect squares:

1, 4, 9, 16, 25

B. What are the square roots of these numbers?

$\sqrt{1}$  ,  $\sqrt{4}$  ,  $\sqrt{9}$  ,  $\sqrt{16}$  ,  $\sqrt{25}$   
 1 , 2 , 3 , 4 , 5

C. Which numbers are between the first three perfect squares?

$\sqrt{1}$   $\sqrt{2}$   $\sqrt{3}$   $\sqrt{4}$   $\sqrt{5}$   $\sqrt{6}$   $\sqrt{7}$   $\sqrt{8}$   $\sqrt{9}$   
 1 2 3

Estimate  $\sqrt{3.2}$

When a number can not be written as a product of two identical whole numbers or identical fractions are called **non-perfect squares**.

**What is the square root of 10.2?**

$$\sqrt{10.2}$$

1. Benchmarks-- find the two perfect squares that 10.2 is closest to.

2. Then estimate

$$\begin{array}{ccc} & \sqrt{10.2} & \\ \sqrt{9} & & \sqrt{16} \\ \text{Between} & 3 & 4 \end{array}$$

1. Using a benchmark  $\sqrt{17.5}$  Estimate.

perfect  
squares

Benchmarks

$$\sqrt{16} \quad \sqrt{17.5} \quad \sqrt{25}$$

$$4 \quad \quad \quad 5$$

Use Benchmarks'

$$\sqrt{\frac{8}{5} \times 20}$$

$$\sqrt{\frac{160}{100}}$$

Can you make the denominator 100????

$$\sqrt{\frac{160}{100}}$$

Benchmarks

	$\sqrt{\frac{144}{100}}$	$\sqrt{\frac{169}{100}}$
Fraction	$\frac{12}{10}$	$\frac{13}{10}$
Decimal	1.2	1.3

# Use Benchmarks

$$\sqrt{0.30}$$

Fractions

$$\sqrt{\frac{30}{100}}$$

$$\sqrt{\frac{25}{100}}$$

$$\sqrt{\frac{36}{100}}$$

Between  $\frac{5}{10}$

$$\frac{6}{10}$$

Decimals

$$\sqrt{0.30}$$

$$\sqrt{0.25}$$

$$0.5$$

$$\sqrt{0.36}$$

$$0.6$$

# Estimate using benchmarks:

a)  $\sqrt{51.2}$

$\sqrt{49}$        $\sqrt{64}$

~~Between~~ 7      8

*\* change to 100 for denominator*

b)  $\sqrt{\frac{6}{10}} = \sqrt{\frac{60}{100}}$

$\sqrt{\frac{49}{100}}$        $\sqrt{\frac{64}{100}}$

$\frac{7}{10}$        $\frac{8}{10}$

*change to fraction*

c)  $\sqrt{0.82}$

$\sqrt{\frac{82}{100}}$

$\sqrt{\frac{81}{100}}$        $\sqrt{\frac{100}{100}}$

$\frac{9}{10}$        $\frac{10}{10}$

0.9      1



## Show Benchmarks

a)  $\sqrt{2.1}$

$\sqrt{1}$        $\sqrt{4}$

Between 1      2

Denominator of 100

b)  $\sqrt{\frac{7}{20} \times 5}$        $\sqrt{\frac{35}{100}}$

$\sqrt{\frac{25}{100}}$        $\sqrt{\frac{35}{100}}$        $\sqrt{\frac{36}{100}}$

Between  $\frac{5}{10}$        $\frac{6}{10}$

## Use Fractions to estimate:

$\sqrt{\frac{3}{50} \times 2}$

$\sqrt{\frac{3}{50}} = \sqrt{0.06}$

$\sqrt{\frac{4}{100}}$

$\frac{2}{10}$

$\sqrt{\frac{6}{100}}$

$\sqrt{\frac{9}{100}}$

$\frac{3}{10}$

Benchmarks  
 Between

Estimate

$$\sqrt{0.4} = \sqrt{\frac{4}{10}}$$

a.  $\sqrt{0.40}$

b.  $\sqrt{\frac{495}{10}}$

Fraction

Decimal

$$\begin{array}{l} \sqrt{\frac{36}{100}} \\ \frac{6}{10} \end{array} \quad \begin{array}{l} \sqrt{\frac{40}{100}} \\ \sqrt{\frac{49}{100}} \\ \frac{7}{10} \end{array}$$

$$\begin{array}{l} \sqrt{0.36} \\ 0.6 \end{array} \quad \begin{array}{l} \sqrt{0.40} \\ \sqrt{0.49} \\ 0.7 \end{array}$$

$$\begin{array}{l} \sqrt{49} \\ 7 \end{array} \quad \begin{array}{l} \sqrt{49.5} \\ \sqrt{64} \\ 8 \end{array}$$

What could you use as a bench mark to find

$$\sqrt{\frac{15}{26}} = \sqrt{\frac{16}{25}}$$

(around)  $\frac{4}{5}$

## Benchmarks / Estimate

A)  $\sqrt{101.2}$

Benchmarks  $\sqrt{100}$        $\sqrt{121}$

Between 10      11

b)  $\sqrt{\frac{7}{25} \times 4}$

$\sqrt{\frac{28}{100}}$

$\sqrt{\frac{25}{100}}$        $\sqrt{\frac{36}{100}}$

5/10      6/10

