Date_____ Name_____

Unit 1 – Pythagorean Relationship

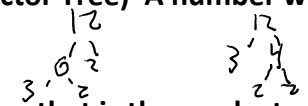
1.1: Squares & Square Roots

Prime Number **A number that only has two (2) DISTINCT factors.**

Ex. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53

Prime Factorization **(Factor Tree) A number written as a product of only prime numbers.**

Ex. $12 = 2 \cdot 2 \cdot 3$



Perfect Square **A number that is the product of two (2) equal factors.**

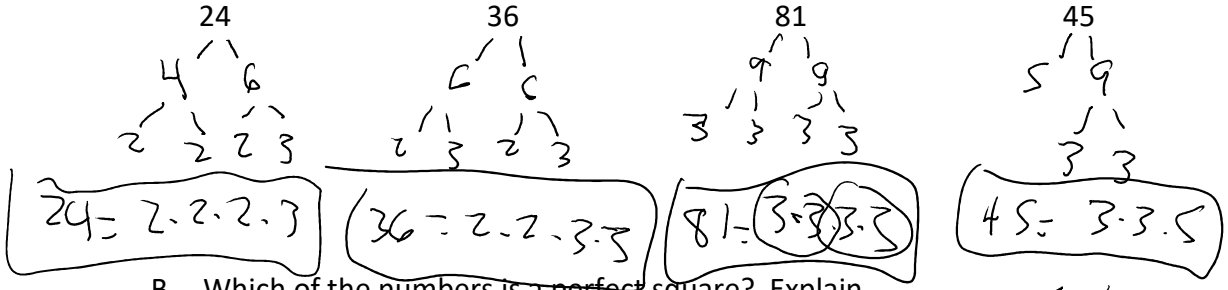
Ex. 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

Square Root **A number when multiplied by itself equals a given value.**

$\sqrt{\ }$ Ex. $\sqrt{1} = 1$ $\sqrt{4} = 2$ $\sqrt{9} = 3$ $\sqrt{81} = 9$

Example 1: Identifying Perfect Squares

A. Determine the prime factorization of the numbers:



B. Which of the numbers is a perfect square? Explain

~~24~~ 36 = 2·2·3·3 ✓ equal number of prime factors

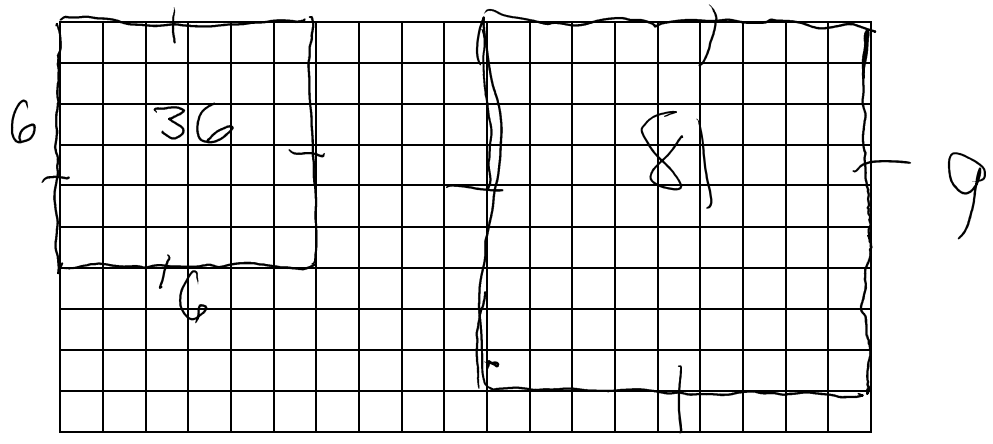
$\sqrt{36} = 6$

81 ✓

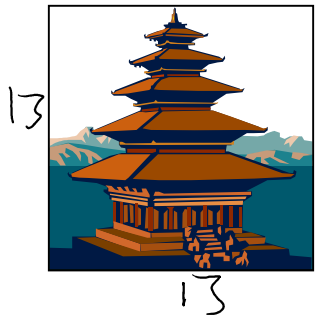
$\sqrt{81} = 9$

~~45~~

C. For each number that is a perfect square, draw the square and label its side length.



Example 2: Determining the Square of a Number



Determine the area of a square picture with a side length of 13 cm.

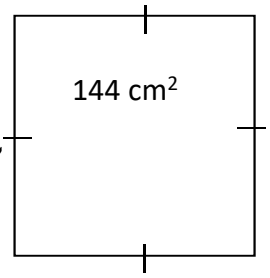
$\square^2$ x^2 $13^2 = 169\ cm^2$

Determine the area of a square with a side length of 16 cm.

$16^2 = 256\ cm^2$

Example 3: Determine the Square Root of a Perfect Square

Edgar knows that the square case for his computer game has an area of 144 cm^2. What is the side length of the case?



Method 1:

Guess & check
$10^2 = 100$ X
$11^2 = 121$ X
$12^2 = 144$ ✓
12 cm

Method 2:

Prime Factor
$\sqrt{144}$
$= 2 \cdot 2 \cdot 3$
$= 12$ cm

144
2 72
2 36
3 18
3 6
2

$2 \cdot 2 \cdot 3 \quad 2 \cdot 2 \cdot 3$

Method 3:

$\sqrt{144} = \square$

12

Determine the side length of a square with an area of 196 cm^2.

$\sqrt{196} = 14$ cm

Find each root (approximate tenth if necessary):

$\sqrt{25} = 5$ $\quad$ $\sqrt{81} = 9$

actual

$\sqrt{10} = 3.2$

9 10 16
$\sqrt{9}$ $\sqrt{16}$
3 4
6

≈ 3.1
OK
3.2

$\sqrt{32} = 5.7$

25 32 36
$\sqrt{25}$ $\sqrt{36}$
5 6
7 4

≈ 5.7

Practice Pg.10/ #1 – 2, 4 – 10, 12, 15 – 17, 20 – 22, 24