Perfect Squares Day 1

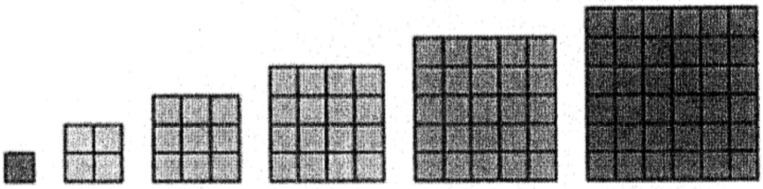
December 1, 2016 1:29 PM

Math 8 Name: _____

Perfect Squares

A **perfect square** is a number made by "squaring" a whole number. Squaring means to multiply by itself. The symbol for squaring in a tiny number 2 written on the top right corner.

$4^2 = 4 \times 4 = 16$ $5^2 = 5 \times 5 = 25$ Etc...



Shape number	1	2	3	4	5	6
Number of small squares	1x1=1	2x2=4	3x3=9	4x4=16	5x5=25	6x6=36

Every number can multiply to make a perfect square, but not every number is a perfect square.

TASK – Complete Perfect Squares Table

(AREA) (SIDELENGTH)

The number that is multiplied to create the perfect square is called a **square root**.

$\sqrt{9} = 3$

$\sqrt{16} = 4$

$\sqrt{81} = 9$

$3^2 = 9$ ← the perfect square (area)

the square root (side length)

Calc: 3 [x²] = 9 ; 9 [√] = 3

TASK – Complete Square Roots Table

To go FROM the perfect square (area) TO the square root (side length) you NEVER EVER EVER DIVIDE by 4!!!

NEVER EVER EVER DIVIDE by 4!!!

We can also determine whether a number is a perfect square by using **prime factorization**.

To write a prime factorization statement we need to break down the number into it's prime factors. A prime factor is a factor of the original number that is also a prime number (not divisible by anything but 1 and itself). We can do this by creating a factor tree.

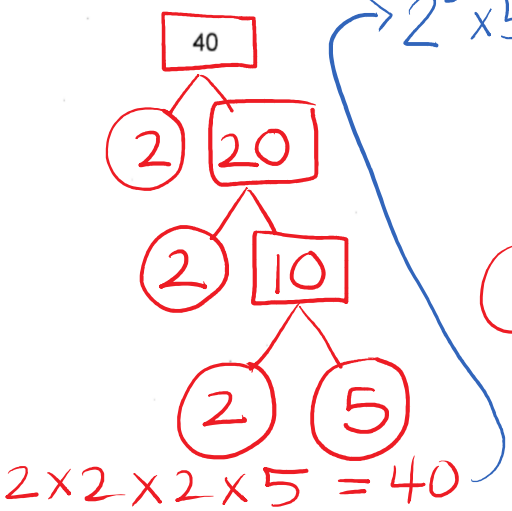
Examples of prime numbers: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, ...

Memorize

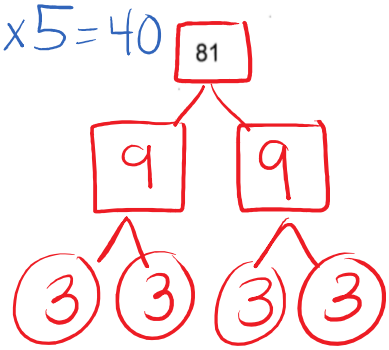
The number "1" is NOT a prime number.

The rectangles mean factor again! The circles mean stop → prime factor.

Ex. Use a factor tree to determine the prime factorization statement for each number.



$2^3 \times 5 = 40$



$3 \times 3 \times 3 \times 3 = 81$

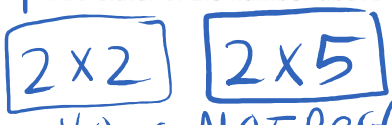
$3^4 = 81$

$3 \boxed{\wedge} 4 =$

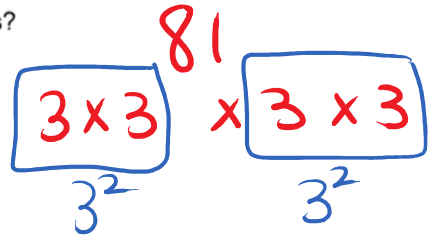
$3 \boxed{xy} 4 =$

If you can organize the prime factors into TWO IDENTICAL GROUPS, then the original number was a perfect square.

4 Are either of the number above (40 & 81) perfect squares?



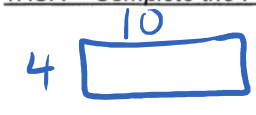
40 is Not Perf Sq.



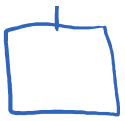
9 x 9

Square

TASK – Complete the Factor Tree WS



Rectangle

9  Square

Squares

$1^2 = 1 \times 1 = 1$	$5^2 = 5 \times 5 = 25$	$9^2 = 9 \times 9 = 81$
$2^2 = 2 \times 2 = 4$	$6^2 = 6 \times 6 = 36$	$10^2 = 10 \times 10 = 100$
$3^2 = 3 \times 3 = 9$	$7^2 = 7 \times 7 = 49$	$11^2 = 11 \times 11 = 121$
$4^2 = 4 \times 4 = 16$	$8^2 = 8 \times 8 = 64$	$12^2 = 12 \times 12 = 144$

Square Roots

$\sqrt{1} = \pm 1$	$\sqrt{25} = \pm 5$	$\sqrt{81} = \pm 9$
$\sqrt{4} = \pm 2$	$\sqrt{36} = \pm 6$	$\sqrt{100} = \pm 10$
$\sqrt{9} = \pm 3$	$\sqrt{49} = \pm 7$	$\sqrt{121} = \pm 11$
$\sqrt{16} = \pm 4$	$\sqrt{64} = \pm 8$	$\sqrt{144} = \pm 12$

Math 8 Name: _____

Perfect Squares Table

(Side Length) (AREA)

Number	Exponent Form	Multiplied Form	Perfect Square
1	1^2	1 x 1	
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Math 8 Name: _____

Square Roots Table

(Area) (Side Length)

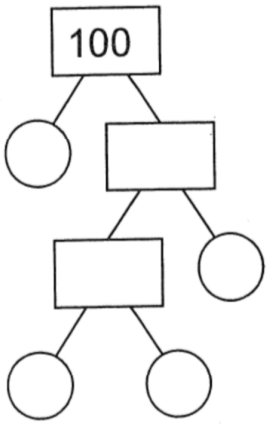
Number	Square of Number	Square Root	Reason
1	$\sqrt{1}$	1	1 x 1 = 1
4	$\sqrt{2}$	2	2 x 2 = 4
9			
16			
25			
36			
49			
64			
81			
100			
121			
144			
169			
196			
225			
256			
289			
324			
361			
400			

Name : _____ Score : _____

Teacher : _____ Date : _____

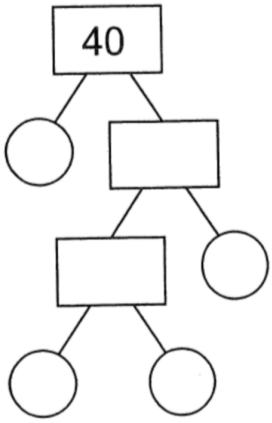
Find the Prime Factors of the Numbers

1)



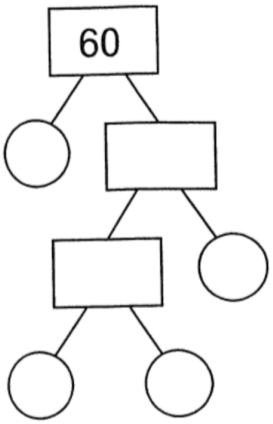
Prime Factors
_ x _ x _ x _ = 100

2)



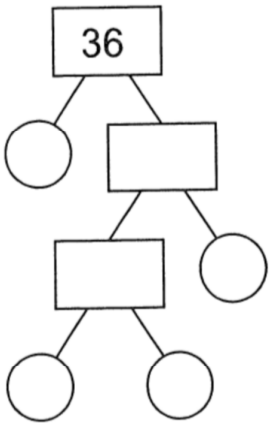
Prime Factors
_ x _ x _ x _ = 40

3)



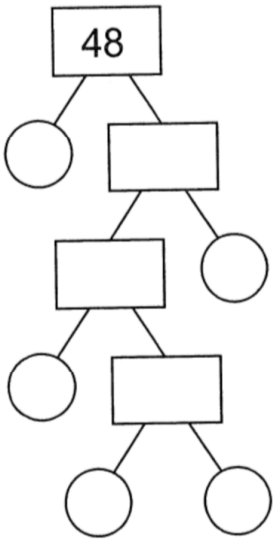
Prime Factors
_ x _ x _ x _ = 60

4)



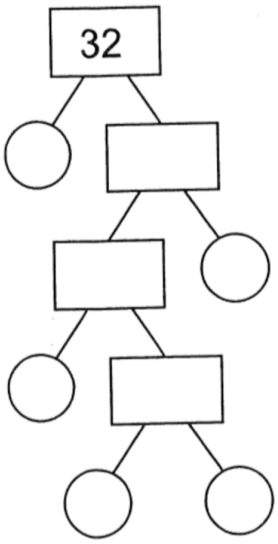
Prime Factors
_ x _ x _ x _ = 36

5)



Prime Factors
_ x _ x _ x _ x _ = 48

6)



Prime Factors
_ x _ x _ x _ x _ = 32