

## $\sqrt{44}$

## Square Roots

The square root $(\sqrt{ })$ of a number finds the factor that when multiplied by itself will give you the square number. In other words it goes from area to side length. Back to the root.

$$
\sqrt{144}=12 \rightarrow 12^{2}=144
$$

A square root and a square are opposite operations.

## Even donald knows something about square roots.



## Exploring Square Roots

## FUN WITH SQUARES AND SQUARE ROOTS!



## Exploring Square Roots Calculators are permitted.

## INVESTIGATE!

Working with a partner, complete the table below. Indicate all of the factors for a given whole number along the bottom of the table. Remember, that if a number multiplied by itself gives you the target whole number, only copy down that factor once. For instance: $9=3 \times 3$, however the factors for 9 are: 1, 3, $9-$ not $1,3,3,9$.

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|  |  |  |  |  | 6 |  | 8 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 4 |  | 3 |  | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 2 | 3 | 2 | 5 | 2 | 7 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |  | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |


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|  |  |  | 4 |  |  | 3 |  |  |  |  |  | 3 |  | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 2 | 3 | 2 |  | 5 | 2 |  |  |  |  |  | 2 | 7 | 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 1 | 1 |  | 1 | 1 |  |  |  |  |  | 1 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 2 | 3 | 4 |  | 5 | 6 |  |  |  |  |  | 6 | 7 | 8 | 9 | 10 | 1 | 1 | 12 | 13 |  | 4 | 15 | 16 | 17 |  |  | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

## Questions:

1. Which numbers have only two factors? What do you notice about these numbers?
2. Which numbers have an even number of factors, but more than 2 factors?
3. Which numbers have an odd number of factors?


| Odd \# of Factors | Even \# of Factors |
| :---: | :---: |
| square number |  |

When a number has an odd number of factors, it is a square number.
$36=I, 2,3,4,6,9,12,18,36 \longrightarrow 9$ Factors

The square number can be always found in the middle.

Fill in this table...

| Square Root | Square Number |
| :---: | :---: |
| 4 |  |
|  | 64 |
|  | 144 |
| 7 |  |
| 13 | 100 |

## Your Turn

I.The factors of 136 are listed in ascending order.
$136=1,2,4,8,17,34,68,136$
Is 136 a square number?
2. Find:
$4^{2}$
-
25
$6^{2}$
$8^{2}$
$7^{2}$
$9^{2}$
$I^{2}$
$\sqrt{25}$
$\sqrt{64}$
$\sqrt{81}$
$\sqrt{16^{2}}$

