IDENTIFYING PERFECT SQUARES


(more mathematical cats)

Take the whole numbers and square them:

$0^2 = 0$
$1^2 = 1$
$2^2 = 4$
$3^2 = 9$
and so on.

The resulting numbers $0, 1, 4, 9, 16, 25, 36, \ldots$ are called ***perfect squares***.

DEFINITION *perfect square*

A number p is called a ***perfect square*** if and only if
there exists a whole number n for which $p = n^2$.

In other words:
How do you get to be a ***perfect square***?
Answer: By being equal to the square of some whole number.
(Recall that the ***whole numbers*** are $0, 1, 2, 3, \ldots$)

In this exercise, you will decide if a given number is a perfect square.
The key is to rename the number (if possible) as a whole number, squared!
You may want to review this section first: Equal or Opposites?

EXAMPLES:

Question: Is 9 a perfect square?
Solution: Yes. $9 = 3^2$

Question: Is 7 a perfect square?
Solution: No. The number 7 can't be written as a whole number, squared.

Question: Is 17^2 a perfect square?
Solution: Yes. The number 17 is a whole number, so 17^2 is a whole number, squared.

Question: Is 17^4 a perfect square?
Solution: Yes. Rename as $(17^2)^2$. The number 17^2 is a whole number, so $(17^2)^2$ is a whole number, squared.

Question: Is $(-6)^2$ a perfect square?
Solution: Yes. Rename as 6^2. The number 6 is a whole number, so 6^2 is a whole number, squared.

Question: Is -6^2 a perfect square?
Solution: No. Recall that $-6^2 = (-1)(6^2) = (-1)(36) = -36$. A perfect square can't be negative. Be careful!
The numbers -6^2 and $(-6)^2$ represent different orders of operation, and are different numbers!

Question: Is $(-7)^{12}$ a perfect square?
Solution: Yes. Rename: $(-7)^{12} = 7^{12} = (7^6)^2$.
The number 7^6 is a whole number, so $(7^6)^2$ is a whole number, squared.

Question: Is -4 a perfect square?
Solution: No. A perfect square can't be negative.