Insights project

E29 - Distinct powers

Consider all integer combinations of  for and :

If they are then placed in numerical order, with any repeats removed, we get the following sequence of 15 distinct terms:

4, 8, 9, 16, 25, 27, 32, 64, 81, 125, 243, 256, 625, 1024, 3125

How many distinct terms are in the sequence generated by  for and ?

Guides (you will need to submit these for full credit):

1. If we are considering  for and :

a. Which values of 'a' are candidates to create duplicates when raised to the power of 'b' ?

b. What are the duplicates, and how many distinct terms there are in the overall sequence?

2. If we are considering  for and :

a. Which values of 'a' are candidates to create duplicates when raised to the power of 'b' ?

b. What are the duplicates, and how many distinct terms there are in the overall sequence?

Now, generalize your result to the case given.

🡺 Keep in mind: You need to show a detailed explanation of your solution.

\* About the name: This problem is based on Euler Project problem number 29.

=== End ====