

Distinct powers

Problem 29

Consider all integer combinations of a^b for $2 \leq a \leq 5$ and $2 \leq b \leq 5$:

$$2^2=4, 2^3=8, 2^4=16, 2^5=32$$

$$3^2=9, 3^3=27, 3^4=81, 3^5=243$$

$$4^2=16, 4^3=64, 4^4=256, 4^5=1024$$

$$5^2=25, 5^3=125, 5^4=625, 5^5=3125$$

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 a^b for $2 \leq a \leq 100$ and $2 \leq b \leq 100$?