1

please format the questions properly. Thank you. The question should read:

If x is a positive integer and z is a non-negative integer such that 2,066^z is a divisor of 3,176,793, what is the value of z^x - x^z?
A. -81
B. -1
C. 0
D. 1
E. It Cannot Be Determined

3,176,793 is an odd number. The only way it to be a multiple of 2,066^z (even number in integer power) is when $z=0$, in this case $2{,}066^z=2{,}066^0=1$ and 1 is a factor of every integer. Hence $z=0$ --> $z^x-x^z=0^x-x^0=0-1=-1$.

Answer: B.

Must know for the GMAT: $a^0=1$, for $a\neq0$ - any nonzero number to the power of 0 is 1. **Important note: the case of 0^0 is not tested on the GMAT.**

2

The point is that $3*9^y$ does not equal to 27^y: $3*9^y=3*3^{2y}=3^{2y+1}$ on the other hand $27^y=(3^3)^y=3^{3y}$.

Solution:
If 9x = 27^y, which of the following expresses x in terms of y?
A. 3^y
B. 3^(y-1)
C. 3^(2y-1)
D. 3^(2y-3)
E. 3^(3y-2)

$9x=3^2*x$ and $27^y=(3^3)^y=3^{3y}$ --> $3^2*x=3^{3y}$ --> $x=\frac{3^{3y}}{3^2}$ --> $x=3^{3y-2}$.

Answer: E.

3

Trial and error would probably be the easiest way to solve this problem. When x is large enough positive number, then because of the exponents (5>4), LHS will be more than RHS (as you increase the positive value of x the distance between the values of LHS and RHS will increase).

Try x=1 --> LHS=3^5=81*3=243 and RHS=4^4=64*4=256, so (1 + 2x)^5 < (1 + 3x)^4. As you can see LHS is still slightly less than than RHS. So, the value of x for which (1 + 2x)^5 = (1 + 3x)^4 is slightly more than 1.

Answer: C.

4

The function basically transforms the digits of integer n into the power of primes: 2, 3, 5, ...

For example:
$p(9)=2^9$;
$p(49)=2^9*3^4$;
$p(349)=2^9*3^4*5^3$;
$p(6349)=2^9*3^4*5^3*7^4$;
...

The question asks for the leas number that cannot be expressed by the function p(n).

So, the digits of n transform to the power and since single digit cannot be more than 10 then p(n) cannot have the power of 10 or higher.

So, the least number that cannot be expressed by the function p(n) is $2^{10}=1,024$ (n just cannot have 10 as its digit).

Answer: D.

5

Plug-in method should work form most of the people.

Else you can realize that $4^x+\frac{1}{4^x}=2$ is the sum of a positive number and its reciprocal and it to equal to 2 each must be 1 --> $4^x=1$ --> $x=0$;

Or: let $4^x=a$ --> $a+\frac{1}{a}=2$ --> $\frac{a^2+1}{a}=2$ --> $a^2-2a+1=0$ --> $(a-1)^2=0$ --> $a=1$ --> $4^x=a=1$ --> $x=0$.

Answer: C.