1

Is a even?

(1) 2a is even --> a can be even as well as odd. Not sufficient.

(2) $\sqrt{a}$ is even --> $\sqrt{a}=even$ --> $a=even^2=even$. Sufficient.

Answer: B.

2

How many different prime numbers are factors of the positive integer n?

(1) 4 different prime numbers are factors of 2n --> if n itself has 2 as a factor (eg $n=2*3*5*7$) than its total # of primes is 4 **but** if n doesn't have 2 as a factor (eg $n=3*5*7$) than its total # of primes is 3. Not sufficient.

(2) 4 different prime numbers are factors of n^2 --> n^x (where x is an integer ≥ 1) will have as many different prime factors as integer n, exponentiation doesn't "produce" primes. So, 4 different prime numbers are factors of n. Sufficient.

Answer: B.

3

If Z is an integer, is Z prime?

(1) $15!<z$ --> z is more than some number ($15!$). z may or may not be a prime. Not sufficient.

(2) $17!+2\leq z\leq 17!+17$ --> z cannot be a prime. For instance if $z=17!+13=13*(2*4*5*6*7*8*9*10*11*12*14*15*16*17+1)$, then z is a multiple of 13, so not a prime. Same for all other numbers in this range. So, $z=17!+x$, where $2\leq x\leq 17$ will definitely be a multiple of x (as we would be able to factor out x out of $17!+x$, the same way as we did for 13). Sufficient.

Answer: B.

4

If y is a positive integer is $\sqrt{y}$ an integer?

Note that as y is a positive integer then $\sqrt{y}$ is either a positive integer or an irrational number. Also note that the question basically asks whether y is a perfect square.

(1) $\sqrt{4*y}$ is not an integer --> $\sqrt{4*y}=2*\sqrt{y}\neq integer$ --> $\sqrt{y}\neq integer$. Sufficient.

(2) $\sqrt{5*y}$ is an integer --> y can not be a prefect square because if it is, for example if $y=x^2$ for some positive integer x then $\sqrt{5*y}=\sqrt{5*x^2}=x\sqrt{5}\neq integer$. Sufficient.

Answer: D.