1

# of trailing zeros in 20!, 21!, 22!, 23!, and 24! will be 4 (20/5=4. For 21!, 22!, 23! and 24!, instead of 20 you'll have 21, 22, ... but the result will be the same) --> total of 4*5=20 trailing zeros for these 5 terms. (Note here that this won't always be correct: for example 20 and 50 have one trailing zero each but 20*50=1,000 has three trailing zeros not two. That's because extra 2 in 20 and extra 5 in 50 "produced" one more trailing zero. In our case though, we won't have any extra 5-s in any factorial, as all are already used for existing trailing zeros);

# of trailing zeros in 25!, 26!, 27!, 28!, and 29! will be 5+1=6 (25/5+25/5^2=6) --> total of 6*5=30 trailing zeros for these 5 terms;

# of trailing zeros in 30!, 31!, 32!, and 33! will be 6+1=7 (30/5+30/5^2=7) --> total of 7*4=28 trailing zeros for these 5 terms;

So, $(20!*21!*22!*...*33!)^{3!}=(10^{20}*10^{30}*10^{28}*something)^{3!}=(10^{78}*something)^6=10^{468}*something^6$.

Total of 468 trailing zeros.

Answer: A.

Or as we have (something)^6 then the # of trailing zeros must be multiple of 6 only answer choice A satisfies this.

2

The rate of a certain chemical reaction is directly proportional to the square of the concentration of chemical A present and inversely proportional to the concentration of chemical B present. If the concentration of chemical B is increased by 100%, which of the following is closest to the percent change in the concentration of chemical A required to keep the reaction rate unchanged?
A 100% decrease
B 50% decrease
C 40% decrease
D 40% increase
E 50% increase

NOTE: Put directly proportional in nominator and inversely proportional in denominator.
$RATE=\frac{A^2}{B}$, (well as it's not the exact fraction it should be multiplied by some constant but we can ignore this in our case).

We are told that B increased by 100%, hence in denominator we have 2B. We want the rate to be the same. As rate is directly proportional to the SQUARE of A, A should also increase (nominator) by x percent and increase of A in square should be 2. Which means $x^2=2$ --> $x\approx 1.41$, which is approximately 40% increase. $R=\frac{A^2}{B}=\frac{(1.4A)^2}{2B}=\frac{2A^2}{2B}$

Answer: D.

3

Say there are A gallons of fuel A in the tank, then there would be 200-A gallons of fuel B.

The amount of ethanol in A gallons of fuel A is 0.12A;
The amount of ethanol in 200-A gallons of fuel B is 0.16(200-A);

Since the total amount of ethanol is 30 gallons then 0.12A+0.16(200-A)=30 --> A=50.

Answer: E.