Example: Question: If $\frac{y^{p^2}}{y^{q^2}} = y^{40}$ *and p+q=4 find the value of (p-q).*

A) 10
B) 20
C) 40
D) 160

For speed, while solving something similar, only THINK the words in blue; WRITE only the words in other COLORS.

Given: 1) an equation.
2) sum of the powers of variable "y".

Road Map of Solution:
First Step: Restate the equation so that we can compare the powers on both sides of the equation.
Second Step: Substitute the value of (p+q) in the equation created above in the "first step".
Third Step: Solve.

$\frac{y^{p^2}}{y^{q^2}} = y^{40}$ *eq#1*

First Step: Restate the eq#1 above, so that we can compare the powers on both sides of the equation.
$y^{p^2-q^2} = y^{40}$ *eq#1b*

Now, compare the powers on both sides of the equation,
$p^2 - q^2 = 40$ *eq#2*

Restating the above equation, we get,
$(p - q)(p + q) = 40$ *eq#2b*

Second Step: Substitute the given value of (p+q) in eq#2b
$(p - q)(4) = 40$

To find the value of (p-q), we need to, rewrite/manipulate eq#2c, such that it reads ONLY (p-q) on the LHS (Left Hand Side)
That can be achieved, if we multiply $\frac{1}{4}$ *to both sides of eq#2c*
Doing the same thing to both sides of an equation simultaneously, does NOT change the equation.
It only changes the LOOK of the equation.
$(p - q)(4) \times \left(\frac{1}{4}\right) = 40 \times \left(\frac{1}{4}\right)$ *eq#2c*

$(p - q)(1) \times \left(\frac{1}{1}\right) = 10 \times \left(\frac{1}{1}\right)$

$(p - q) = 10$ *Answer (A)*