

Continuing the discussion of some stand alone topics, let's discuss an important number property today. It is not only useful to know for GMAT but, if understood well, will also help you a lot during your MBA, especially if you are keen on subjects in Finance since these subjects use a lot of ratios — e.g., Financial Leverage, P/E etc. You will often come across a situation where you will need to compare ratios. Say, you have a given ratio  $N/D$ . Now, a number 'A' is subtracted from both N and D. Is the new ratio  $(N - A)/(D - A)$  greater than or less than  $N/D$ ? The answer depends on the original value of  $N/D$ .

The main concept is as follows:

When we add the same positive integer to the numerator and the denominator of a positive fraction, the fraction increases if it is less than 1 (but remains less than 1) and decreases if it is more than 1 (but remains more than 1). That is, we can say, that the fraction is pulled toward 1 in both the cases.

Let us understand this with the help of some examples:

Example 1:  $N/D = 1/2$

If we add 3 to both the numerator and the denominator,  $N/D$  changes to  $4/5$ . Notice that  $4/5$  is greater than  $1/2$  i.e. it is closer to 1 than  $1/2$  but is still less than 1.

Example 2:  $N/D = 7/3$

If we add 3 to both the numerator and the denominator,  $N/D$  changes to  $10/6 = 5/3$ . Notice that  $5/3$  is less than  $7/3$  i.e. it is closer to 1 than  $7/3$  but is still greater than 1.

These two examples depict how the ratio is 'pulled' toward 1.

What happens if you subtract the same positive integer (or, in other words, add a negative integer) from both N and D?

When we subtract the same positive integer from the numerator and the denominator of a positive fraction, the fraction decreases further if it is less than 1 and increases further if it is more than 1. That is, we can say, that the fraction is pushed further away from 1 in both the cases. An assumption here is that the positive number subtracted is less than both the numerator and the denominator.

Example 1:  $N/D = 3/5$

If we subtract 1 from both the numerator and the denominator,  $N/D$  changes to  $2/4 = 1/2$ . Notice that  $1/2$  is even more less than  $3/5$  i.e. it is further away from 1 than  $3/5$ .

Example 2:  $N/D = 7/3$

If we subtract 2 from both the numerator and the denominator,  $N/D$  changes to  $5/1 = 5$ . Notice that 5 is greater than  $7/3$  i.e. it is further away from 1 than  $7/3$ .

These two examples depict how the ratio is 'pushed' further away from 1.

Now let's see how this concept helps us in solving GMAT-relevant questions.

Question: Two positive integers that have a ratio of 3:5 are increased in a ratio of 1:1. Which of the following could be the resulting integers?

(A) 3 and 5

- (B) 5 and 13
- (C) 21 and 30
- (D) 34 and 68
- (E) 75 and 45

When the ratio 3:5 is increased in the ratio 1:1, it means that both the numerator and the denominator are increased by the same number. Since  $N/D (=3/5)$  is less than 1, adding the same number to both the numerator and the denominator will take  $N/D$  closer to 1 i.e. it will increase  $N/D$  but  $N/D$  will still remain less than 1. So the answer option should lie between  $3/5$  and 1. Only option (C) satisfies this condition and hence answer is (C).

I hope you understand the concept now. We expect it will be particularly useful when attacking the new [GMAT Integrated Reasoning](#) questions coming in 2012. Keep practicing!