Approximations in Division

Data Interpretation questions typically have large amounts of data given in the form of tables, pie-charts, line graphs or some non-conventional data representation format. The questions are calculation heavy and typically test your approximation abilities. A very large number of these questions check your ability to compare or calculate fractions and percentages. If you sit down to actually calculate the answer, you would end up spending more time than required. Here are few ideas that you can use for approximation.

Calculating (Approximating) Fractions

When trying to calculate (approximate) a fraction p/q, add a value to the denominator and a corresponding value to the numerator before calculating (approximating, in whole number ratio)..

Example,

What is the value of *1989/ 762 ?*

If we look at the denominator, we can either take it close to 750 or to 800. We know that the answer is between 2 and 3, so for adding values / subtracting values from the denominator or the numerator, lets consider a number lying midway or 2.5.

Case 1: 762 is 12 above 750, so we will subtract 12 from the denominator. Keeping the factor of 2.5 in mind, I will subtract 30 from the numerator.

My new fraction is,

(*1989 - 30) / (762 - 12) = 1959 / 750 = 1959 × (4/ 3000) = 1960× 4/ 3000 = 784/300 = 2.62*

Actual answer is 2.61. Even if you write 2.5 and look at the options, then you can easily answer the questions. As you can see, with a little effort involved in approximation, we arrived really close to the actual answer.

Case 2: 762 is 38 below 800, so I will add 38 to the denominator. Keeping the factor of 2.5 in mind, I will add 95 to the numerator.

My new fraction is,

(*1989 + 95) / (762 + 38) = 2084 / 800 = as simple as 208/8 and DIVIDE by 10 or shift the decimal place 1 place to the LEFT = 2.61*

As you can see, even this is close to the actual answer.

Comparing Fractions

1. If the numerator is less than the denominator and the difference between the numerator and denominator is same, then the fraction having the lowest numerator is the lowest fraction and the fraction having the largest numerator is the largest fraction.

2. If the numerator is greater than the denominator and the difference between the numerator and denominator is same, then the fraction having the lowest numerator is the largest fraction and the fraction having the largest numerator is the lowest fraction.

Note: You can remember this by keeping in mind that,

1/2 < 2/3 < 3/4 < 4/5 ...

and

3/2 > 4/3 > 5/4 > 6/5 ...

For Example..

Arrange the following in increasing order: *67/79, 127/139, 223/235*

In all these fractions we are seeing that the numerator is less than the denominator and the difference between the numerator and denominator is same i.e.12. Hence the fraction having the lowest numerator is the lowest fraction. Hence *67/79 < 127/139 < 223/235*

Take another example

Arrange the following in increasing order: *67/79, 78/89, 33/40*

Let's first compare 67/79 & 78/89.

If we added 11 to the numerator and the denominator of the first proper fraction, the resulting proper fraction would be 78/90, which will be bigger in value than the original (as per 1)

We know that 78/90 is smaller than 78/89, as the latter has a lower denominator, numerator being same.

So, 67/79 < 78/90 < 78/89 or 67/79 < 78/89.

Now lets compare 67/79 and 33/40.

If we double the numerator and denominator of the second proper fraction, the resulting proper fraction would be 66/80. 67/79 is definitely more than 66/80, since the numerator (67>66) and denominator is lower(79<80).

Hence 67/79 > 33/40. Hence 33/40 < 67/79 < 78/89.

This question can be solved in an alternate way by just looking at the numbers and approximately comparing them with numbers ending with 0. Hence 33/40, 68/80(instead of 67/79) and 80/90 (instead of 78/89) seems much easy to comprehend. This number when simplified becomes

a. 33/40 closer to 32/40 or 32/4(remember 32 comes in table of 4 at 8).. hence a number equal to 0.8 + (1/40)
b. 68/80 is just more than 64/80 (same as 32/40) . Hence a number equal to 0.8 + (4/80 or 1/20). Hence 68/80 > 33/40 since 1/20 > 1/40.
c. 80/90 is closer to 81/90 or 81/9 (81 comes in the table of 9 at place 9). Hence a number very close to 0.9.

In summarizing we can say that number very close to 0.9 > Number more than 0.8 by 1/20 > Number more than 0.8 by 1/40.

Hence 33/40 < 67/79 < 78/89.

The trick of solving this is to imagine numbers closer to 0s. The lesser impurity added, the purer the result or in short the more accurate the result.

Try to calculate the value of fractions given below till 2 places

a. 71/83
b. 1023/336
c. 215/39
d. 6234/9163
e. 457835/5836272

Practice some questions below and see where you find yourself. You will come to understand that the bigger the number, the more freedom you get in making either the numerator or denominator more closer to 0 and then approximating accordingly. When you get a much smaller number at either the numerator or denominator or both, you have to be a little careful.