

A FRAMEWORK TO PRETHINK IN QUANTITATIVE PREDICTIVE ARGUMENTS

Analysis of more than 300 OG questions suggests that almost 8-10% of the CR questions belong to one category – **Quantitative Predictive Arguments** - implying that in all likelihood, you'll encounter one or two questions of this type in the actual GMAT. The purpose of this article is to help you build an efficient thought process for solving these questions and thereby, simultaneously improve accuracy and efficiency.

To begin with, let's look at one OG question of this type. Take 2-3 minutes to solve this question.

Near Chicago a newly built hydroponic spinach "factory," a completely controlled environment for growing spinach, produces on 1 acre of floor space what it takes 100 acres of fields to produce. Expenses, especially for electricity, are high, however, and the spinach produced costs about four times as much as washed California field spinach, the spinach commonly sold throughout the United States.

Which of the following, if true, best supports a projection that the spinach-growing facility near Chicago will be profitable?

- A. Once the operators of the facility are experienced, they will be able to cut operating expenses by 25 percent.*
- B. There is virtually no scope for any further reduction in the cost per pound for California field spinach.*
- C. Unlike washed field spinach, the hydroponically grown spinach is untainted by any pesticides or herbicides and thus will sell at exceptionally high prices to such customers as health food restaurants.*
- D. Since spinach is a crop that ships relatively well, the market for the hydroponically grown spinach is no more limited to the Chicago area than the market for California field spinach is to California.*
- E. A second hydroponic facility is being built in Canada, taking advantage of inexpensive electricity and high vegetable prices.*

After solving the question, think about the parameter about which a prediction is to be made and information given about the other parameter(s) on the basis of which this prediction is to be made. We'll shortly be looking at all this.



WHAT ARE QUANTITATIVE ARGUMENTS

Before moving forward, let's first define the term we used: "Quantitative Predictive Arguments"
- It basically refers to those questions that talk in terms of numbers - absolute numbers, percentages, or proportions - and make a prediction about one parameter on the basis of value of some other parameters. Hence to summarize:

These questions talk about a variable, say Z, which is a function of X and Y,

$$Z = f(X, Y)$$

and the question (the passage or the stem) makes **conclusions or predictions** about **Z** on the basis of value of one of the parameters, say, X. So, it could say that since X is increasing, it means Z is also increasing.

A simple example of this could be an argument shown below:

Company A has cut down its expenses by 15% over the last year. This implies that company A has made more profits this year.

HOW TO APPROACH QUANTITATIVE PREDICTIVE ARGUMENTS

For easy reference, I am going to use the acronym QPA, for this category of questions. In GMAT, QPA questions come across various question types such as Weaken, Strengthen, Evaluate, Flaw in the Reasoning, and Assumptions. It is possible to solve the above stated question types in 30 seconds or less by leveraging the structure of the QPA argument. To illustrate the same, we will take another look at the argument that we just presented.

Company A has cut down its expenses by 15% over the last year. This implies that company A has made more profits this year.

So, it's talking about two things, Profits and Costs, and it concludes something about the profits on the basis of some change in costs. However, we know that Profits is a function of two variables: Revenues and Costs and is given by:

$$\text{Profits} = \text{Revenues} - \text{Costs}$$

So, we know that costs have come down. But what about the other factor - revenues? Have they remained constant? Have they increased? Have they decreased? Nothing as such is mentioned.

Now, this kind of argument can be used to create all kinds of questions. For example:

- An **assumption** could be that there were no adverse changes in the revenue figures compared to the last year
- A **weakeners** to the above argument could indicate that revenues of company A have declined over the last year.
- A **strengtheners** would either imply that revenues remained constant or that the revenues increased.
- An **evaluate** question would have an answer such as, "Whether the revenues of company A declined this year?"
- A **flaw in the reasoning** could say something along the lines of - "The argument fails to consider that there could be adverse changes in the parameters, other than the costs, which could affect profits"

HOW TO FIND THE CORRECT OPTION CHOICE IN LESS THAN 30 SECONDS

We have observed that these kinds of questions are quite prominent in GMAT. But how does our current understanding help us?

The answer is that it helps us in prethinking (guessing) the answer before moving to the answer choices. So, whenever we see that a prediction (increase or decrease) about a variable is made on the basis of change in some other variable(s), we can immediately draw an equation on the paper about the relation of the two variables and see what other variables are there in the equation.

Almost always, there will be one other variable and almost always, the answer choice is going to talk about the other variable, which is not considered in the passage or the question stem. We have provided 10 official questions on which you can apply the approach discussed above.

Now, let's go back to our factory spinach example:

We are given that the factory spinach costs about four times the cost of commonly sold. Now, we

need to find out an option statement that supports the claim that the factory spinach could still be profitable.

So, we draw the equation:

$$\text{Profit from spinach} = \text{Revenue from Spinach} - \text{Cost of spinach}$$

Here, kindly note that we are talking about all these terms **per unit of spinach**.

Now, the passage talks about high costs but it doesn't talk about the revenues or in this case price per unit of factory spinach. So, as per our understanding of QPA type questions, the correct option choice would be the one talking about price. We see that only option C fits this criteria and this is the answer choice.

So, instead of analyzing every option choice and finding how it affects the conclusion, we are just looking for an option choice which talks about the price of factory spinach. This significantly brings down the time required to go through the options and improves accuracy since we don't get trapped in wrong but attractive answer choices.



Here, it's important to pay attention to the below two points:

- Option C is the correct choice, not only because it is talking about prices but because it is talking about prices in a manner that strengthens the given argument, which is our requirement. If this option statement had stated something about prices which does not impact the argument or weaken it, it would not have been the correct answer choice.
- Option E also mentions “high vegetable prices” but as one can easily see, this statement is primarily talking about other hydroponic facility and is thus irrelevant to the argument at hand.

So, while this framework will help you eliminate irrelevant option fast, you need to evaluate the option statements remaining after elimination to see whether they fit the requirement.

Let's look at the application of this understanding on a supply demand scenario. Consider this question from OG:

In the past the country of Malvernia has relied heavily on imported oil. Malvernia recently implemented a program to convert heating systems from oil to natural gas. Malvernia currently produces more natural gas each year than it uses, and oil production in Malvernian oil fields is increasing at a steady pace. If these trends in fuel production and usage continue, therefore, Malvernian reliance on foreign sources for fuel is likely to decline soon.

Which of the following would it be most useful to establish in evaluating the argument?

- (A) When, if ever, will production of oil in Malvernia outstrip production of natural gas?
- (B) Is Malvernia among the countries that rely most on imported oil?
- (C) What proportion of Malvernia's total energy needs is met by hydroelectric, solar, and nuclear power?
- (D) Is the amount of oil used each year in Malvernia for generating electricity and fuel for transportation increasing?
- (E) Have any existing oil-burning heating systems in Malvernia already been converted to natural-gas-burning heating systems?

The question is talking about import of fuel to meet the deficit in demand and supply. In equation form, it is:

$$\textbf{Import} = \textbf{Demand} - \textbf{Supply}$$

$$\textbf{Import of Natural Gas and Oil} = (\textbf{Demand} - \textbf{Supply})_{NG} + (\textbf{Demand} - \textbf{Supply})_{oil}$$

Now, we know that the first parenthesized expression is negative and in the second expression, we are only told about supply of oil, not the demand, so the answer choice must be talking about demand of oil.

We see that option D and option E talk about the demand of oil. So, options A, B and C can be eliminated right away.

While option D directly asks whether oil consumption is increasing or not, option E talks about shifting of consumption from oil to natural gas. Since, we are concerned about import of both oil and natural gas; a shift from oil to natural gas will not impact us. It'll only change whether we need to import oil or natural gas.

Thus, option D is the correct choice.

So, again we can see that approaching options with an objective in mind helps us in eliminating them at

a much faster speed than otherwise and time saved is score improved in GMAT.

Now, let's just formalize our thinking process to apply in QPA type questions:

Find out the relation between the parameters discussed in the question

Write down the relation in the form of an equation

Eliminate option statements that don't impact the other parameter of the equation

Evaluate the remaining option statements to find the correct answer

Here, it is important to note that the second step i.e. writing down the equation is very helpful and is a must in the beginning, since there could be times when the question will try to trick you into believing that it has talked about both the parameters even when it has not. Having an equation in the written form will help you maintain clarity. As you practice the exercise questions given along this article, you'll be able to appreciate this better.

HOW TO DETERMINE IF A QUESTION FALLS IN THIS CATEGORY

Our question category is QPA i.e. Quantitative Predictive Arguments type. So, the question has to make some quantitative predictions (i.e. increase or decrease) in some parameter to qualify as this question type. For example, the **below OG question** talks about profits but it's not a QPA type since there are no predictions made.

Suncorp, a new corporation with limited funds, has been clearing large sections of the tropical Amazon forest for cattle ranching. This practice continues even though greater profits can be made from rubber tapping, which does not destroy the forest, than from cattle ranching, which

does destroy the forest.

Which of the following, if true, most helps to explain why Suncorp has been pursuing the less profitable of the two economic activities mentioned above?

- (A) The soil of the Amazon forest is very rich in nutrients that are important in the development of grazing lands.
- (B) Cattle-ranching operations that are located in tropical climates are more profitable than cattle-ranching operations that are located in cold-weather climates.
- (C) In certain districts, profits made from cattle ranching are more heavily taxed than profits made from any other industry.
- (D) Some of the cattle that are raised on land cleared in the Amazon are killed by wildcats.
- (E) The amount of money required to begin a rubber-tapping operation is twice as high as the amount needed to begin a cattle ranch.



EXCEPTIONS TO THE APPROACH

While we have not come across an exception to our approach in the official questions researched, we cannot eliminate a scenario where an exception may arise. The scenario is when the passage talks about one of the factors affecting the outcome and the option statement also talks about that factor. For example, in our spinach factory, a correct option statement could also have been:

Factory spinach has much longer shelf life than Californian spinach, a large proportion of which gets rotten during storage and transportation.

So this statement has an impact on costs (storage costs) but it talks about costs after the production. So it says that while production costs may be higher for factory spinach, overall

costs might be less or equal.

However, this kind of scenario would constitute an exception, rather than a rule.

Therefore, we would recommend that one follow the framework suggested and only if no option statement satisfies the requirement, then consider this scenario.

TAKE AWAY

Draw an equation on paper which explicitly states the relationship between the parameters.

Eliminate the option statements that don't talk about the other parameter in the equation.

Evaluate the remaining option statements to find the correct answer.

EXERCISE PROBLEMS

We have included 10 OG questions which belong to this category. Put your answers in the responses. Also include the relevant equation used in solving the question.

We'll post the answers along with the equations once we have sufficient number of responses.