

Illogical, Captain!

A brief introduction to Logic for the Verbal Section of the GMAT Exam

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Several of the questions that you will meet on the Verbal section of the GMAT exam take the form of Critical Reasoning questions. They attempt to test your ability to follow an argument, spot the weaknesses in it, argue evidence both supporting (in favour of) and undermining (against) a position.

While a large number of these questions are difficult to put into pigeon holes and teach formally, some of them involve logical deduction, and that can be boiled down to a few formal rules. Here are some of those rules. In each case, I have given them almost in the form of a mathematical equation, which should make them easier to learn.

Modus ponens

This simply means: "If X is true, then Y must be true. We know that X is in fact true. So Y must be true as well." Writing it symbolically, $X \rightarrow Y$, X true, Y true. (where \rightarrow means "implies" and means "therefore").

It is also possible to use modus ponens incorrectly. Here is the invalid form of the same thing:

"If X is true, then Y must be true. We know Y is true. So X must be true as well." or $X \rightarrow Y$, Y true, X true.

This doesn't necessarily follow. We know that X being true makes Y true, but there may be other things apart from X which make Y true as well. Here are two examples of modus ponens, the first a correct one, the second incorrect:

Whenever it rains, I take an umbrella to work. It is raining, so I shall take an umbrella to work today.

That is perfectly logical. Don't be put off by the use of the future tense, or the fact that we assume you are going to work (it might be Sunday) - they are side points to the argument. If we write "It is raining" as X and "I take/will take an umbrella" as Y, then the statement fits the modus ponens pattern exactly. Tick! Well done!

The bells you can hear now are always rung during a funeral. Someone must have died!

This is a little harder to recognise. It doesn't use words like "implies" or "therefore", but it is still a version of modus ponens. We can rewrite it as follows: "Whenever a person dies/has a funeral, those bells are rung. The bells are ringing now. Therefore someone has died/there is a funeral."

We are taking "a person dies" and "there is a funeral" to mean the same thing - a reasonable assumption. Taking that to be X, and "the bells are rung" to be Y, you see that it fits the pattern for the invalid form of modus ponens perfectly. It doesn't follow that the bells are only rung when there is a funeral. They could be rung for weddings, baptisms, air raids etc.

Modus tollens

This is the flip-side of modus ponens: "If X is true, then Y must be true. We know that Y is *not* in fact true. So X can't be true either." Symbolically, $X \rightarrow Y$. Not Y , \rightarrow not X .

Since X automatically causes Y, if Y is not true, then X can't be either. Again, there is an invalid form of modus tollens:

"If X is true, then Y must be true. We know that X is *not* in fact true. So Y can't be true either." Symbolically, $X \rightarrow Y$. Not X , \rightarrow not Y .

Hey! Wait a moment. We know X causes Y, but that doesn't mean that there aren't other things that cause Y. Just because X isn't true, Y could be caused by something else. Here are two examples of modus tollens, again, one goodie and one baddie!

Whenever the weather is fine, I am always in a good mood. I am rather out of sorts today, so the weather can't be that good!

Yes, this is logical. X here becomes "The weather is fine/good," and Y becomes "I am in a good mood." You have to know that "out of sorts" means "in a rather bad mood," in which case Y is not true, so X can't be either.

Paul gets a win on his premium bonds quite often. A premium bond win causes him to come in to work with cigars for everyone. He did not win on the premium bonds today, so I don't think he will be handing round the cigars when he gets in!

There may be many reasons why Paul hands round cigars. He did it on his birthday, and again when he got engaged to Sarah. Just because he hasn't had that little envelope from Ernie (the computer that picks the premium bond winners) doesn't necessarily mean that he won't be giving out cigars at work.

Careful of the wording!

You have to check the wording of a question very carefully. If it includes phrases such as "if and only if" then you may find that the invalid forms of modus ponens and modus tollens suddenly become valid. Let's take a look at that example about the bells again:

The bells you can hear now are only rung during a funeral. Someone must have died!

Notice the subtle change? Now the bells are rung during a funeral *and on no other occasion*. What you see above is now a valid logical deduction. If you go through it with a fine tooth comb, you will find that it is a version of modus ponens, with X now being "The bells are ringing" and Y being "There is a funeral going on." You will notice that X and Y are now the opposite way round from the previous version. All that from changing just one word!

Discount your own views

Remember, you should only follow the logic of the argument, not try to include your own opinions or things that you think you know. Even if the statement includes "facts" which directly contradict your own opinions, you should put that on one side. Here's an example:

All snakes have feathers. I have a pet snake. I must have at least one pet which has feathers.

Huh?! Snakes don't have feathers. That's not the point. The fact is, that statement is a perfectly logical version of modus ponens. You just have to suspend your disbelief about snakes and feathers for a moment. A less flippant example:

Jesus did not state that smoking was a sin. Therefore smoking is not a sin.

This is based on an assumption that whatever Jesus said was a sin, is actually a sin. Obviously, whether you accept this or not depends on your own personal religious views, not to mention any views you may have on smoking! However, whether you accept it or not, you should still be able to argue it logically. Writing X for "Jesus stated that smoking is a sin" and Y for "Smoking is a sin" we get X → Y, not X, → not Y, which you should be able to see is an invalid form of modus tollens.

Exercise 1

In this exercise, each of the deductions is either modus ponens or modus tollens, and it may be valid or invalid. Identify each deduction appropriately. For each question, write down in words what is represented by X and Y and also put down the symbolic form of the deduction in that question.

1. There is no evidence for UFOs being of extraterrestrial origin. Therefore, UFOs do not come from another planet.
2. Skunks always produce a powerful unpleasant smell. There isn't a skunk in this room. Therefore, there isn't an unpleasant smell in the room either.
3. I despise people who read and believe horoscopes. Paul reads his horoscope every day and accepts every word, and as a result, I hold him in utter contempt!
4. Lead sulphide is a yellow compound which melts at less than 200°C. I have a sample of a chemical in front of me which has not melted, even though I have heated it to several hundred degrees with a bunsen burner on its hottest setting. I conclude that this sample is not lead sulphide.
5. All bings are bangs and all bangs are bong. I have an item in front of me which I am sure is a bing. Therefore I have at least one bong in front of me. (Another whisky please, bartender!)
6. My dog Dylan loves being brushed. At the moment, he is not a happy doggie, so I can't have just brushed him. True?
7. Dylan barks loudly when he is alarmed or frightened. One night I woke up when he barked fiercely. I concluded that he must have been either alarmed or frightened, so I tiptoed down the stairs expecting to find a burglar in the house. Was my conclusion a logical one?

Exercise 2

This exercise is more general. There are no answers to it - it is just for you to think about and discuss.

1. It is known that an influenza sufferer always has a runny nose and a high temperature. What can we reasonably conclude from the fact that Henry does not have a runny nose?
 - A. He must have a high temperature.
 - B. He must have influenza.
 - C. He may have influenza but it is not certain.
 - D. He cannot have a high temperature.
 - E. He cannot have influenza.
2. Tom placed a bet on Greased Lightning at the greyhound stadium last night. After the race he went to collect his winnings from the bookies with whom he bets regularly. Which one of the following **MUST** be true?
 - A. Greased Lightning won the race.
 - B. Tom did not win any money on Greased Lightning.
 - C. Greased Lightning may have won the race, but it is not absolutely certain.
 - D. Tom must have bet upon another dog running in the same race as Greased Lightning.
 - E. Tom placed a bet on at least two dogs running at the stadium that night.
3. If a creditor has a distraining order against him and a constraining order against him, then he is legally declared *extincta crapta*. Up in front of the judge this morning is a man who has been declared *extincta crapta*. The judge must conclude that
 - A. The man may have either a constraining order or a distraining order against him.
 - B. The man may have either a constraining order or a distraining order *but not both* against him.
 - C. The man must have both a constraining order and a distraining order against him.
 - D. The man can have neither a constraining order nor a distraining order against him.
 - E. The man must have a constraining order against him, but nothing is known about whether he has a distraining order against him.
4. If a number is a multiple of 6, then it must also be a multiple of 3 and it must be an even number. I have a number X which is a multiple of 3. I may assume that:
 - A. It must be an even number.
 - B. It may be an even number but doesn't have to be.
 - C. It cannot be an even number.
 - D. It cannot be a multiple of 6.
 - E. It can be a multiple of 6 or an even number, but not both.

The Alternative Syllogism

You what? Don't worry. This is really rather simple: "**We know either X or Y is true. X isn't true, so Y must be**" Symbolically, $X \text{ or } Y. \text{ Not } X, \quad Y.$

If at least one of the things must be true, then if the first one isn't true, the second one must be. The same thing applies the other way round: If the second item isn't true, then the first one must be! In fact, we can write the alternative syllogism the other way round: "**We know either X or Y is true. Y isn't true, so X must be**" Symbolically, $X \text{ or } Y. \text{ Not } Y, \quad X.$

You want an example? All right then!

I am thinking of a whole number. It is not an even number. Therefore it must be an odd number.

What I haven't stated is that there are only two types of whole numbers, even and odd. However, I think that you might be expected to know that already. Since the number must be either even or odd, and since it is not even, it must therefore be odd. Entirely logical!

You notice that the alternative syllogism doesn't state that *only* one of the statements is true. They can both be true. Indeed the invalid form of the alternative syllogism is to assume that because one of the statements is true, the other one can't be: **We know either X or Y is true. X is true, so Y must be false** (or **Y is true, so X must be false.**) Symbolically: $X \text{ or } Y, X, \text{ not } Y$, or alternatively $X \text{ or } Y, Y, \text{ not } X$.

Again you have to be very careful about the wording. In the example above, the number was either odd or even. We knew it couldn't be both at the same time. You have to read the questions carefully to determine whether both the possible options could happen at the same time.

When it rains, as it is doing today, I always take an umbrella or go to work by car in order to avoid getting wet. I decided to go to work by car today, so it follows that I didn't take an umbrella with me.

No it doesn't! You could have taken the umbrella with you as well. Generally speaking, look out for the words *either ... or* in the question. This will invariably indicate that they can't both happen together, and the assumption that "X happened so Y couldn't have happened" is a valid one.

Disjunctive syllogism

Oh, crumbs! He's off again with the gobbledy-gook. What's a disjunctive syllogism? Well, it's the flip-side of the alternative syllogism. It says that **X and Y can't both be true. X is true, so Y can't be.** Symbolically: $\text{Not } (X \text{ and } Y), X \text{ is true, not } Y$.

Just as the alternative syllogism can be written the other way round, so can the disjunctive syllogism: **X and Y can't both be true. Y is true, so X can't be.** Symbolically: $\text{Not } (X \text{ and } Y), Y \text{ is true, not } X$.

This is really the true identity of the *either ... or* case mentioned in the previous section. "Either ... or" implies one or the other but not both, which is the disjunctive syllogism.

Just as the alternative syllogism has an invalid form, so does the disjunctive syllogism: **X and Y can't both be true. X is not true, so Y must be.** Symbolically: $\text{Not } (X \text{ and } Y), \text{ not } X, Y$. (You can, of course, swap the Xs and Ys round in that). The reason that this form is invalid is, just because they can't both be true, it doesn't necessarily follow that one of them has to be.

No chemical compound of chromium is ever coloured white. I have a sample of material that is coloured white. Therefore, it is not a chromium compound.

This is logical. The two mutually exclusive alternatives are that either the compound contains chromium or that it is coloured white. Since it *is* white, then it can't contain chromium.

No chemical compound of chromium is ever coloured white. I have a sample of material that isn't coloured white. Therefore, it must be a chromium compound.

No, wait a minute! There are many non-white compounds that don't contain chromium (potassium permanganate, for example), so this is the invalid form of the disjunctive syllogism.

Exercise 3

This exercise is similar to Exercise 1, except that the deductions can be any of the four types discussed above, as well as being valid or invalid. Please determine what X and Y are in each case, what type of logic is being applied and whether the deduction is a valid or an invalid one.

1. I through a die just once. It can't come up showing both a 1 and a 4. It has not come up showing a score of 1. Therefore it must be showing a score of 4.
2. Whenever the red light is on and the green light is off, it means that the protection shields are no longer in place covering the uranium core. The protection shields are covering the uranium core, yet the green light is off. This means that the red light must be off also.
3. All cannabis users inevitably graduate on to using heroin. Herbie is now using heroin, so he must have started off as a cannabis user.
4. Our leisure centre had a budget of £100,000 last year to be spent on a swimming pool costing £60,000 or a gymnasium costing £55,000. We went ahead and ordered the swimming pool to be built. Therefore we did not spend any money on having a gymnasium built last year.
5. Linda was told that if she was given a dog for her last birthday, she would have to walk it regularly. She does not go out regularly with a dog, therefore she was not given a dog for her last birthday.
6. My biology text book tells me that no birds are mammals. I conclude that no mammals are birds.

Exercise 4

This exercise is similar to the preceding one, except all the deductions follow from this short passage of text. Again, you should identify what logical construction is being used and whether it is a valid one.

There are only two things on the menu at my local greasy-spoon cafe, i.e. the ploughman's lunch or Sammy's Surprise. If I order the ploughman's lunch, I will end up eating mashed potato. If I order Sammy's Surprise, I will find myself eating spicy sausage. I order one of these two meals.

1. If I eat spicy sausage, then I must have ordered Sammy's Surprise.
2. If I do not eat mashed potato, then I must have ordered Sammy's Surprise.
3. If I eat mashed potato, then I must have ordered the ploughman's lunch.
4. I will eat either mashed potato or spicy sausage, but not both.
5. I will eat both mashed potato and spicy sausage.

An example question from a real GMAT test

Well, actually, this is from page 152 of the 2000 Edition of the ARCO GMAT CAT Guide, by Thomas Martinson (published by Macmillan, USA). I do hope they don't mind me quoting it!

When it rains, my car gets wet. Since it hasn't rained recently, my car can't be wet.

Which of the following is logically most similar to the argument above?

- A. *Whenever critics give a play a favourable review, people go to see it; Pinter's new play did not receive favourable reviews, so I doubt that anyone will go to see it.*
- B. *Whenever people go to see a play, critics give it a favourable review; people did go to see Pinter's new play, so it did get a favourable review.*
- C. *Whenever critics give a play a favourable review, people go to see it; Pinter's new play got favourable reviews, so people will probably go to see it.*
- D. *Whenever a play is given favourable reviews by the critics, people go to see it; since people are going to see Pinter's new play, it will probably get favourable reviews.*
- E. *Whenever critics give a play a favourable review, people go to see it; people are not going to see Pinter's new play, so it did not get favourable reviews.*

If you write "It rains" as X and "my car gets wet" as Y, the original statement becomes $X \supset Y$, X is false, Y is false. You should by now instantly recognise this as the invalid form of modus tollens. What we need to do is to go through the five statements about Pinter and his play and see which one matches the same pattern.

I will leave you to do the logic. Fortunately, since all the possible options are based on the same two basic statements, we need only do the translation once: X = "Critics give a play favourable reviews," and Y = "People go to see the play." Be careful of options where the critics' response is dependent on whether people go to see the play - you may need to write these options the other way round.

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Different Types of Critical Reasoning Question

- [Assumptions](#)
- [Some Xs are Ys](#)

It is not always possible to classify the critical reasoning questions neatly, but there are some categories that we can name. This doesn't much help you to answer them, I admit, but it does help you to target your practice to those types of question that give you problems.

Use of logical formalisms

This type of question is dealt with more fully in its own section. [Click here](#) to view that.

Assumptions

A short passage of text is given which draws a conclusion. You are then asked to identify an assumption that is implied in the passage but not stated. The question then asks you to identify which assumption is hiding just beneath the level of the text. Here is an example question:

More and more nowadays schools in Britain are being sponsored by commercial companies. Macdonald's for example, has been approached to provide money for school equipment, repairs to buildings, and eventually, presumably, teachers' salaries. This blatant propaganda and brain-washing of the children can only lead to an increase in direct product placement.

Which of the following assumptions underlies this argument?

- A. *Children prefer MacDonal'd's hamburgers to any other on the market.*
- B. *Schools cannot get sponsorship from any source other than commercial companies.*
- C. *Children will be influenced by the products that companies try to introduce into schools.*
- D. *The companies' motives for increasing school sponsorship are purely selfish.*
- E. *Any companies that agree to sponsorship will automatically use it as an opportunity for product placement.*

There is one test that we can apply that is sure to work - the **Denial Test**. This says, *Negate the assumption (i.e. assume that the opposite to the assumption is true), then see if the logical conclusion still holds. If it doesn't - i.e. if the logical conclusion now falls apart - then the original assumption was essential to the conclusion.*

Let's tackle all those statements, bearing the Denial Test in mind:

Children prefer MacDonal'd's hamburgers to any other on the market. This answer can be quite easily dismissed. The argument in the text doesn't rely on the preferences of children. Indeed, it would still be valid if children hated McDonald's hamburgers. The argument is about sponsorship of schools. Usually, these sorts of questions have one of the options that can be easily dismissed. The others won't be so easy.

What does the Denial Test say about this one? Let's reverse the option: *Children don't prefer MacDonal'd's Hamburgers.* Well, this doesn't affect the argument at all, so it can't be the underlying assumption.

Schools cannot get sponsorship from any source other than commercial companies. This is a sneaky one! We might assume that this was the case, since if schools were adequately supported by the government or some other official body, why would they need to turn to

commercial companies. However, this is not the point of the argument. The point is that turning to commercial companies leads to product placement.

The Denial test again: *Schools can get sponsorship from other sources.* Again, this does not destroy the argument, as it only refers to the companies' actions once they have been accepted into the schools.

Keep this second option in mind. If we can't find a better answer amongst the remaining options, then we can come back to this one.

Children will be influenced by the products that companies try to introduce into schools. This one is even better. Presumably, the commercial companies would push their products in the schools in the hope of interesting children (Who was it who said "Grab 'em while they're young!") I think this takes the "best option yet" slot, but let's check the others.

The Denial test: *Children won't be influenced by the products companies introduce into schools.* This is *almost* enough to destroy the argument, which underlines the fact that it is our best choice yet. Even so, the argument does not imply that the children will be influenced, just that the companies will try to place the products in the first place.

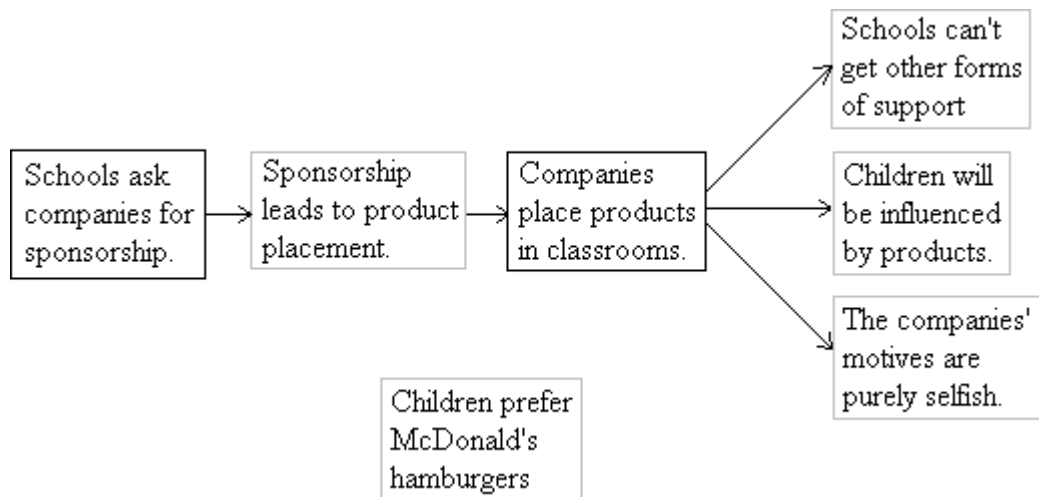
The companies' motives for increasing school sponsorship are purely selfish. This is another good option, probably as good as the previous one. Still, I don't like that word "purely". The companies may have good motives - helping the children - as well as selfish ones.

The Denial Test: *The companies' motives are not purely selfish.* This leaves the original assumption intact. See the comment when the previous option was fed through the Denial Test.

Any companies that agree to sponsorship will automatically use it as an opportunity for product placement. Ah, this is the missing link in the argument! The author starts by stating that schools are turning to companies for sponsorship. Then the record needle jumps a groove, and the author mentions the unacceptable product placement. How did we get from sponsorship to product placement? The missing step must be that the sponsorship will lead to the product placement.

What does the Denial Test say about this one?: *Companies will not automatically use this as an opportunity to place products in schools.* Ah, well, the argument concludes that the product placement will happen, so if we remove the assumption that companies *will* place products, the whole argument falls down. The Denial Test has successfully spotted the correct option.

So the first option is neither here nor there, the next three are things that we might reasonably conclude ourselves from the argument, but not building blocks that the argument relies upon and the last option is the missing stepping stone between the first part of the argument and the last. E is the correct answer:



Exercise 1

In each of these questions, there is a small section of text followed by 5 assumptions. You must choose which of the assumptions has to be true for the argument to be a valid one.

- The reason that the U.S. High Court effectively outlawed the company Napster was that it allowed people to download music over the Internet. The loss of revenue to record companies from people downloading music illegally would cripple them and lead to many job losses.

 - Napster was breaking the law by allowing people to download music over the Internet.
 - Allowing people to download music over the Internet would inevitably lead to abuse of that service.
 - People have to download music over the Internet as they cannot afford the prices of records and CDs in the shops.
 - The record companies make a large amount of profit on the legal sales of music records and CDs.
 - Downloading material and information over the Internet is inherently immoral.
- Truancy can often lead children into serious crime. Boredom in lessons causes children to lose interest and start to skip lessons. If every teacher in the land made a concerted effort to make lessons as interesting as possible, we would eliminate truancy at a stroke.

 - Children who play truant tend to become criminals.
 - Truancy is something that should be eliminated as much as possible.
 - Truancy is undesirable because it results in poor academic standards.
 - Boring lessons are the sole cause of truancy.
 - It is desirable to eliminate truancy among school children.
- Dyslexia makes tasks connected with reading, spelling, writing, memory and concentration more difficult. A child with dyslexia may seem very messy in their schoolwork. If your child suffers from symptoms such as these, you should consider having him or her (him, usually - dyslexia affects three times as many boys as girls) to a special school for dyslexic children.

 - The great majority of dyslexics are male rather than female.
 - Dyslexic children can only fulfil their potential in special schools.
 - Untidy work and problems with written work and concentration are caused only by dyslexia.
 - The only symptoms of dyslexia are problems with reading, spelling, writing, memory, concentration and general messy schoolwork.
 - A dyslexic child cannot read or write.

Some Xs are Ys

Just occasionally you get a question like the following:

Some bings are bangs. All bangs are bongs.

Which of the following can we conclude?

- A. *All bings are bongs.*
- B. *All bongs are bings.*
- C. *Some bings are bongs.*
- D. *No bongs are bings.*
- E. *No bongs are bangs.*

Each statement in the question can be rewritten in some form so that it points the other way. For instance, stating **Some bings are bangs** can be rewritten as **Some bangs are bings but not necessarily all**. Similarly, the statement **All bangs are bongs** can be rewritten as **There are some bongs which are bangs** (in fact, that statement does not take into account the fact that being a bang automatically makes you a bong, but that is already encoded in the original statement).

Since we have been told "Some bings are bangs", we can also add the statement **It is possible to be a bing without being a bang**. Adding these statements to our repertoire gives the following set of statements.

Some bings are bangs. All bangs are bongs. Some bangs are bings but not necessarily all. There are some bongs which are bangs. It is possible to be bing without being a bang.

We will compare each statement in turn with this repertoire. If we find a statement that is in direct contradiction with these, then we know that statement cannot be true. If we find a statement that essentially duplicates one the statements in the repertoire, then that statement must be true (i.e. that will be the answer to the question).

If you do this you will see that the only that works entirely is (C) - "Some bings are bongs." Since being a bang automatically qualifies you as a bong, and since some bings are bangs, then those particular bings must be bongs.

An alternative method - visualise!

An alternative is to visualise these made up things using words that you already know. Try replacing "bings" with "men", "bangs" with "police officers" and "bongs" with "working people" gives the following:

Some men are police officers. All police officers are working people

Does this make sense? Yes, there are no inconsistencies there - it agrees with what we know about the world. Let's rewrite the possible answers in the same form:

- A. All men are working people - No, not true.
 - B. All working people are men - Clearly not, women work as well!
 - C. Some men are working people - Yes, this seems reasonable.
 - D. No working people are men - No!
 - E. No working people are police officers - Again, not true!
-

We can see again that the correct answer must be (C). Of course, you have to be careful when assigning the unknown objects to things you already know. You couldn't replace "bings" with "humans" and "bangs" with "mammals" as the first statement would become "Some humans are mammals." Well, clearly, all humans are mammals!

Of course, this method doesn't always work - no analogy may present itself, and you shouldn't take time hunting around for one (in GMAT exams, time is the perpetual enemy!) However, if an every-day analogy immediately becomes obvious, don't hesitate to use it.

More Critical Reasoning Questions

by Richard Bowles

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1. The bus stop outside New Malden police station is visited by the 131 and 265 buses. A 131 bus stops there at exactly 4p.m. What can we conclude about the people waiting at the stop at 4.01p.m. the same afternoon?
 - I. They are probably not waiting for a 131 but we can't be sure.
 - II. They are probably waiting for a 265.
 - III. They are definitely not waiting for a 131.

- A I only
- B II only
- C III only
- D I and II
- E II and III

2. An advert for InterNex Internet service states: "At InterNex we've assembled a fantastic line-up of top-celebrities writing exclusively for you! Now you can pose questions directly to Sarah Cane our Agony Aunt, catch up on all the latest games and gadgets with Craig Boone, and get in the 'Back of the Net' with Gordon Petersen our Football correspondent, debate the ethics behind the news with Joan Fern, plus enjoy a whole host of other top celebrities and online star interviews."

The impact of this advertisement would be lessened by all of the following EXCEPT:

- A A survey shows that 90% of members of the public have never heard of Joan Fern.
- B One of the celebrities listed admitted in a newspaper article that he/she had never heard of InterNex.
- C The people at whom this advert is targeted would probably never use the phrase "Back of the Net".
- D Craig Boone provides services publicly for a rival Internet service.
- E The people at whom the advert is targeted are not generally interested in football or debating ethics.

3. Last night Pete witnessed a gang of white men beating a black man up. He did not report the incident to the police. What a terrible racist he must be!

Which of the following facts would most weaken the conclusion of this argument?

- A Pete thought that the white men were very frightening.
 - B Pete works with several colleagues who are black people.
 - C The next night Pete witnessed a group of black men beating up a white man, and again, did not report the incident to the police.
 - D Pete did not know the black victim personally.
 - E Pete never tells racist jokes or makes racist comments.
4. Some zings are zangs. Some zangs are zongs. Which of the following can we conclude for sure?

- A Some zings are zongs.
 - B No zongs are zings.
 - C All zings are zongs.
 - D All zongs are zangs.
 - E Some zangs are zings.
5. **Questions 5 and 6 refer to the following text**
6. E-business is gradually taking over from ordinary "bricks-and-mortar" premises. The companies listed on the NASDAQ, the stock exchange index for the new technological companies, rose on average more than twice as fast as the fastest-rising stocks listed on the Dow Jones index.
7. The argument above contains which of the following assumptions?

- A The share price of e-businesses will continue to rise.
 - B The Dow Jones index only lists companies which perform badly.
 - C The NASDAQ never lists companies which are performing badly.
 - D The Dow Jones index will continue to rise less quickly than the NASDAQ.
 - E The companies listed on the NASDAQ are not also listed on the Dow Jones.
8. The argument about e-businesses would be strengthened most by which of the following?

- A A report by a financial expert stating that share prices are set to rise in the future.
- B An end-of-year statement by a company listed on the NASDAQ announcing record profits for the past year.
- C An article in the Financial Times indicating that a larger proportion of traditional (non e-business) firms have gone bankrupt than new e-businesses.

- D A novel by a company director about an e-business that succeeds spectacularly.
- E A reduction in corporation tax for new e-businesses by the Chancellor of the Exchequer.
9. Advert: "Veran VE90 Digital Photocopier. New digital technology makes this copier better than your average laser-jet copier. It means you get laser quality printing for only £329.99."

The main selling point of this advertisement would be nullified if:

- A Laser-jet copiers work on average more quickly than the VE90 copier.
- B Laser-jet copiers produced inferior copies to the VE90.
- C Laser-jet copiers cost more than £329.99.
- D The VE90 digital photocopier cost £329.99.
- E Laser-jet copiers cost less than £329.99.
10. You can transfer your ISA to another manager but please note that you can only transfer the whole of an ISA for a current tax year to the same component of the same type of ISA. However, you can transfer some or all of the investments you hold in ISAs for previous tax years, from one component of an ISA to the same component of any mini or maxi ISA. Although we do not currently intend to make a transfer-out charge, we have the right to make a charge of £50 for each transfer.

Which of the following operations are specifically forbidden by this regulation?

- A Transferring an entire maxi ISA to the maxi ISA of another ISA manager.
- B Transferring a mini ISA from last year to a mini ISA for this year.
- C Transferring a maxi ISA from two years ago to a maxi ISA for this year.
- D Transferring a maxi ISA to a mini ISA for another ISA manager.
- E Putting extra money into either a mini or maxi ISA.
11. Headway is now targeted at a wider readership - to include all NUT members who are on the leadership salary spine. This year's NUT membership credential gave members the opportunity to identify themselves as teachers on the leadership spine and Headway will, in future, be mailed directly to all members so identified.

From the text above, which of the following can we reasonably conclude?

- A Headway is a free newspaper.
- B Formerly, the readership of Headway did not include members on the leadership salary spine.
- C Teachers can only be present on the leadership spine thanks to the NUT.
- D The readership for Headway will increase in future years.
- E Teachers cannot get access to Headway unless it is mailed to them.

Questions 10 to 12 are based on the following text

Helping children to establish a healthy relationship with food, so that they see it as a pleasurable aspect of life, is one of the arts of good parenting. The way to do this is not to lecture them about what's good and what's bad. Your own attitude to food is the best role model - if you take positive delight in choosing and cooking the best ingredients, it will be easy and natural for them to participate.

12. The author of the above statement is trying to

- A complain
- B congratulate
- C warn
- D forbid
- E encourage

13. With which of the following statements would the author most likely agree?

- A Do as you would be done by.
- B Don't do as I do, do as I say.
- C Persuasion is better than compulsion.
- D Children should be seen and not heard.
- E Eating is a great comfort when you feel sad.

14. Complete this sentence from the same text with the most suitable choice: "A surprising number of young children are interested in ..."

- A chocolate and sweets
- B becoming a television chef
- C vegetables, carbohydrates and proteins
- D low fat diets
- E cookery and learning about food

15. My car has several faults, each of which is caused by one single action. When I turn on the engine, open the door and close the sunroof, there is a clank and a bang. When I open the door, wind down the window and change gear, there is a twang and a rattle. When I close the sunroof, open the glove compartment and change gear, there is a twang and a clank.

If I open the door, turn on the engine and open the glove compartment, what will I hear?

- A a twang
- B a clank and a bang
- C a bang

- D a bang and a rattle
- E nothing

16. The Union's advice is not to fill in form A, to fill in either form B or form C, and to send whichever one of these you complete back to the Department of Education (DoE). If you have filled in form A and form C, then the Union advises you to enclose the payment demanded.

Which of the following most closely follows the Union's advice?

- A Filling in form B only and returning it to the DoE with the payment demanded.
- B Filling in forms B and C and returning them to the DoE with no payment.
- C Filling in form A and returning it to the DoE with the payment demanded.
- D Filling in forms A and C and returning them to the DoE with the payment demanded.
- E Filling in form C and returning it to the DoE with no payment.

17. The average working man takes about two minutes to shave every morning. If you added up all the time that he spends shaving in a whole year, then it comes to several hours. Just imagine how many working days are being lost every year to employers up and down the country, through the national work force shaving!

The argument above depends on which of the following assumptions?

- A The national work force consists mainly of men who shave.
- B If men didn't have to shave every morning, they would spend the time working instead.
- C Working men shave in the morning rather than in the evening.
- D Men don't shave at the weekend, when they probably wouldn't be at work anyway.
- E Some men take less than two minutes to shave.

18. Titan, a moon which orbits planet Saturn, is the second largest moon in the Solar System, smaller only than Ganymede, one of Jupiter's moons.

Given that the statement above is true, we may logically conclude all of the following EXCEPT

- A No moon larger than Ganymede orbits planet Saturn.
- B Exactly one moon larger than Titan orbits planet Jupiter.
- C Jupiter has at least one moon other than Ganymede.
- D Saturn has at least one moon other than Titan.
- E Titan is larger than Miranda, the largest moon of Uranus, which is another planet in the Solar System.

19.

PETER: I reckon that James probably went to Sunday School.

SARAH: Oh he must have done. He's an educated person!

20. The hidden assumption behind Sarah's statement is that

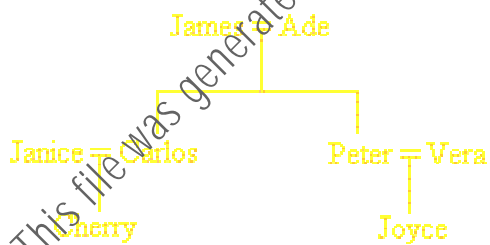
- A All people who attended Sunday School must be educated people.
- B Most people who are educated went to Sunday School.
- C People should attend Sunday School in order to become educated.
- D All people who are educated attended Sunday School.
- E Most people who attended Sunday School are educated.

21. An extract from Cathy's school report: "Cathy has not done her written work particularly well, but has always been willing to volunteer answers when personally required to do so."

This statement is unsatisfactory because

- A it may not be accurate about Cathy's written work.
- B it contains a contradiction.
- C it assumes that the answers Cathy volunteers are correct.
- D the comments about Cathy volunteering answers are incompatible with those made about her written work.
- E it does not specify in what way Cathy's written work is deficient.

22. Consider the following family tree, and the two statements to the side of it.



- The offspring of two blue-eyed parents must have blue eyes.
- The offspring of two parents, one or both of whose eyes are brown, can have either blue eyes or brown eyes.

Assuming that the statements are correct, which of the following does NOT automatically follow?

- A If James and Ade both have blue eyes, then Joyce's eyes will be the same colour as Vera's.
- B If James has brown eyes, the Cherry may have brown eyes.
- C If James and Ade both have blue eyes, then Carlos' eyes will be the same colour as Peter's.

- D Carlos and Peter needn't have the same eye colour as either their mother or their father.
- E If Joyce and James both have blue eyes, it is still possible that Peter has brown eyes.

23.

TOM: I'm sorry, Mum. I promise I won't do it again.

MUM: That's not good enough. If you were sorry, you wouldn't have done it in the first place.

24. Mum's statement is illogical because

- A it ignores the possibility that Tom may have committed the same offence before.
- B it does not specify exactly what Tom is supposed to have done wrong.
- C it does not allow for the possibility that Tom's regret may be entirely sincere.
- D it nullifies the promise that Tom has made.
- E one cannot be sorry for having committed an offence before one has actually committed it.

25. The green light only ever goes on when tank A is full and tank C isn't empty. The red light is always on unless either tank A isn't full or tank B is empty.

Given that the green light is on, we can conclude all of the following EXCEPT

- A Tank A cannot be empty.
- B The red light must be on.
- C Tank C cannot be empty.
- D We don't have enough information to determine whether tank B is empty or not.
- E The red light will only be on if Tank B isn't empty.

26. Mr. Baker, Mr. Butcher and Mr. Builder are a baker, a butcher and a builder, but not in that order. No man has the same profession as his name. Mr. Builder is not a butcher. Which of the following is/are true?

- . Mr. Baker is a butcher.
- I. Mr. Butcher is a baker.
- II. Mr. Builder is a baker.

- A I only.
- B II only.
- C III only.

- D I and II only.
- E I and III only.

27.

AMY: "Alex, I really wish you would keep your dog out of my garden shed. It's got fleas!"

ALEX: (to his dog) "Rex, you hear that? Keep out of Amy's garden shed. It's got fleas!"

28. This short conversation relies for its humour on

- A a deliberate refusal on Alex's part to comply with Amy's wishes.
- B a contradiction.
- C a word with a double meaning.
- D a word with an ambiguous referent.
- E a failure on Alex's part to understand what Amy wants him to do.

29. Heard on an episode of *You and Yours* on Radio 4 (4th July, 2001): "There are about 1 million houses bought a year in Britain, but there are 9 million viewings. This suggests that most people who view houses for sale have no intention of buying."

Which of the following, if true, would most undermine the argument presented?

- A a survey indicating that a large number of people who view houses tend to like what they see.
- B Government statistics that point to the possibility that the number of houses on sale is far fewer than the number of houses demanded by market forces.
- C phone calls from dozens of listeners to *You and Yours* who disapprove of the statement made.
- D An article in a national journal showing that house prices are steadily increasing.
- E A questionnaire handed round to a thousand couples who have recently bought houses, indicating that they viewed on average only three houses before making their final choice.

30. I am in the process of packing boxes onto my lorry (truck). I cannot load box A onto the lorry because that would exceed the maximum weight allowance. On the other hand, if I unloaded box B from the lorry, I would be able to load box C on to the lorry without exceeding the allowance.

Which of the following must be true?

- . If I didn't unload any boxes (including box B), then I wouldn't be able to load box C onto the lorry.
- I. The remaining weight that can be loaded onto the lorry must be at least as big as the difference in weight between boxes B and C.

- II. The weight of box A must be bigger than the difference in weight of boxes B and C

- A I only
- B II only
- C III only
- D I and II only
- E II and III only

31. In a questionnaire sent to twenty thousand recipients chosen at random from the telephone directory, one of the questions asked was "Do you like filling in questionnaires?" It was found that the majority of respondents answered yes to this question. However, it may be argued that the result rather overestimates the proportion of the population who like filling in questionnaires because

- A people who didn't like filling in questionnaires are less likely to return filled-in questionnaires in the first place.
- B people who like filling in questionnaires may well lie when answering various questions.
- C people who dislike filling in questionnaires are more likely to answer yes to the question than might be expected.
- D the question does not take into account the possibility that there may be respondents who neither particularly like nor dislike filling in questionnaires.
- E there may have been an unusually high proportion of the people surveyed who enjoyed filling in questionnaires.

32. Alaister Cooke's doctor was once asked if he ever jogged. His reply was "Only when I am late attending the funeral of a patient who jogged!" Assuming the doctor's statement is true, which one of the following is the most logical conclusion we can draw:

- A The doctor disapproves of people who jog.
- B The doctor only attends funerals when the deceased is a person who jogged.
- C The doctor only attends funerals when the deceased is an ex-patient of his.
- D The doctor never jogs unless he is attending a funeral.
- E The doctor is an ineffectual and dangerous one, because he disapproves of jogging.

33. Paul is shorter than Denise. Since Richard is not as short as Sally, it follows that Richard must be taller than Denise.

Which of the following needs to be added as a premise to make the argument logical?

- A Denise is taller than Paul

- B Denise is taller than Sally.
- C Richard is taller than Sally.
- D Denise and Sally are the same height.
- E Sally is shorter than Paul.

34. Recently, several advertisers have withdrawn their advertisements from Magazine X, claiming that it was due to the fact that the editorial board of the magazine had decided to change the image that the magazine portrays from one of family values to one concerned more with sex and violence. Surely this indicates that the decision-makers in advertising companies do still have a sense of moral propriety that occasionally drives their actions.

Which of the following, if true, would strengthen this conclusion?

- A The advertisers regularly review the placement of their advertisements.
 - B It is a rare event for several advertisers to withdraw all their advertisements simultaneously from a publication.
 - C The advertisers, when questioned, admitted that their clients would lose revenue as a result of the advertisements being withdrawn.
 - D The advertisers all placed new advertisements with other publications that emphasised family values.
 - E A survey of the readership of Magazine X suggested that the majority of the readership think that the standard of the magazine's contents had fallen since its transformation.
35. The University of Virginia is in the middle of the largest cheating scandal of its history, with a record number of students, 157 in all, under investigation for plagiarising term papers. Since this figure compares unfavourably with the 109 students convicted of cheating in some other universities, we may conclude that the University of Virginia has one of the worst cheating records in the United States.

Which of the following, if true, would most seriously weaken the conclusion above?

- A The University of Virginia have instituted an honour pledge to shame students into refraining from cheating.
 - B 93 of the students under investigation have been exonerated.
 - C The allegations of cheating were made after a computer program detected repeated phrases in students' assignments.
 - D Of all the students who are under investigation, only 41 so far have dropped out or been expelled.
 - E The Center for Academic Integrity at Rutgers University discovered in a survey that 40% of students admitted to cheating using the Internet.
-