

# GMAT Flashcards

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*Last Updated: August 3, 2008*

During my GMAT preparation, I made close to 300 flashcards to help me stay fresh on the strategies and materials I had studied over the course of 5 months. This document contains the digitized version of my flashcards—please use them as a study aid. Best of luck!

Eric

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## Codes

On the top left corner of each flashcard, you will find a code. This code will help you classify the information on each flashcard, telling you: which section of the GMAT the information on the card pertains; the problem type; and the question type. For example, if you were to encounter the following code:

V: SC: Idiom

You would know that the information on the given flashcard pertains to the verbal section of the GMAT, addresses a sentence correction problem type, and specifically relates to idiom questions.

## Abbreviations

V – Verbal Section

SC – Sentence Correction

CR – Critical Reasoning

RC – Reading Comprehension

Q – Quantitative Section

DS – Data Sufficiency

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# Sentence Correction Flashcards

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V: SC: *Agree*

Agree with another person.

- “I agree with you on this one.”

Agree to something inanimate.

- “I agree to your proposal.”

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V: SC: *in that* vs. *because*

*in that* is usually better than *because*

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V: SC: Pronoun Errors

Pronoun reference error

- “Samantha and Jane went shopping, but she couldn’t find anything she liked.” (Incorrect)

Pronoun number error

- “The average moviegoer expects to see at least one scene of violence per film, and they are seldom disappointed.” (Incorrect)

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V: SC: Misplaced Modifiers

“Coming out of the department store, John’s wallet was stolen.” (Incorrect)

- 2 ways to fix this misplaced modifier:
  - Change 2<sup>nd</sup> half of sentence.
  - Change first half of sentence into adverbial clause, which contains its own subject.

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V: SC: Parallel Construction

Series of actions set off by commas.

- Spot these problems by finding a series of actions, lists, or sentences divided into parts.

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V: SC: Tense

A sentence that begins in one tense should generally stay in that tense.

- Usually related to parallel construction questions.
- EXCEPTION: Past perfect
  - Action set in the past perfect must have another action that comes after it set in the simple past.
  - “He had ridden his motorcycle for 2 hours when it ran out of gas.”

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V: SC

Politics – Singular word

People – Plural word

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V: SC: Apples and Oranges

Comparison of nouns:

- “The people in my office are smarter than those in other offices.”

Comparison of actions

- “Synthetic oils burn less efficiently than do natural oils.”

Compare like things/actions to like things/actions.

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V: SC: Quantity Words

“On the flight to LA, Nancy had to choose between two dinner entrees.”

Countable Items

- Fewer
- Number
- Many

Non- Countable Items

- Less
- Amount, quantity
- Much

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V: SC: Correct Sentences

1/5 of SC sentences are correct on the GMAT.

- About 3 questions per test.

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V: SC: 3-Step Method

- 1) Read original sentence carefully.
- 2) Scan answer choices for differences that will help identify errors being tested.
- 3) Eliminate a choice as soon as you find an error.

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V: SC: Agreement

Verbs must agree with subjects.

- Watch for collective nouns
  - audience, committee are singular
- Either, or; neither, nor
  - Verbs agree with whatever follows “or/nor”

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## V: SC: Modifiers

Modifiers should be as close as possible to the word or clause it modifies.

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## V: SC: Pronoun

A pronoun must agree with its antecedent and refer to only one antecedent.

- 2 types of errors: reference, agreement
- *that* is singular
- *those* is plural

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## V: SC: -ing

When the GMAT gives you a choice between one verb tense that uses an *-ing* form and another that doesn't, usually the *-ing* form is wrong.

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## V: SC: Verb Tense

Verb tense must reflect the sequence of events.

- 2 reasons to use *-ing* form: emphasize continuing nature of an action or to emphasize that two actions are occurring simultaneously.
- Use simple past tense instead of *had + past tense*.

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## V: SC: Similar Items

Similar elements with the same importance and function should be expressed in the same grammatical form.

Compare people to people, groups to groups, attributes to attributes.

Parallel similar elements in a sentence.

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## V: SC: Like Things

Compare like things only.

Comparison words: like, as, compared to, less than, more than, other, that of, those of.

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V: SC: *like, such as*

*like* = “similar to”

*such as* = “for example”

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V: SC: *like, as*

Use *like* for comparing nouns.

Use *as* for comparing actions.

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V: SC: Idioms involving *as*

Memorize:

*as* is usually preferred over *like*

- regarded as (don't use to be)
- as long as
- such questions as
- plays as

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V: SC: *None/No one*

*None* can be singular or plural.

*No one* is always singular.

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V: SC: Passive Construction

Avoid passive verbs!

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V: SC: Active Tense

Active tense is preferred in sentence correction questions.

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V: SC: Idiom

Agree that

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V: SC: Idiom

When *rates* means “price charged,”  
it should be followed by for

Rates for

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V: SC: Idiom

Distinguish between X and Y.

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V: SC: Idiom

Likely to be

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V: SC: Idiom

Same to X as to Y.

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V: SC: *Greater than/More than*

Greater than is appropriate when describing  
*numbers alone*.

- “Greater than 100...”

More than should be used when describing  
the numbers of objects or when making  
comparisons.

- “More than 100 fish.”

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V: SC: Subordination, Coordination

Coordination

- Equal emphasis – *and, or, but*

Subordination

- Emphasize other part – *although, while, since*

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V: SC: Participles

Adjectives formed from verbs

- “Peter, distracted by his cat and wanting to do his work...”

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V: SC: Ellipsis

Put omitted pieces back into sentence to see if it makes sense.

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V: SC: Passive

Passive voice does not itself contribute an error. Eliminate passive if there is a grammatically correct alternative in the active voice.

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V: SC: *Less*

*Less* is a word used to describe non-count nouns, but also used for sums of money, periods of time and distance, and citations of numerical/statistical data.

- “It’s less than 20 miles to Dallas.”
- “We spent less than \$20.”
- “The town spent less than 4% of its budget.”

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V: SC: *One of the...*

*One of the* + PLURAL NOUN + *that/who/* + PLURAL VERB

- “He is one of the persons who make money.”
- “This is one of the cars that run on hydrogen.”

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V: SC: *Consider*

When *consider* means “regard as,” *as* should not be present with *consider* in the sentence. *Consider* is also not followed by an infinitive like *to be*.

- “Critics consider facilities to be an integral part...” (Incorrect)
- “Critics consider facilities an integral part...” (Correct)

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V: SC: Ellipsis

Most of the time when we use a comparison using *than* or *as*, we leave words out.

- “He is taller than she.”
- “He is as happy as they.”

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V: SC: Idiom

Deciding that

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V: SC: Idiom

Just as...so

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V: SC: Idiom

Not so much...as

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V: SC: Strategy

When the entire sentence is underlined in the question, the answer has a higher probability of being ‘D’ or ‘E’.

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V: SC: Idiom

X forbids Y to do Z

X prohibits Y from doing Z

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V: SC: *If/Whether*

*Whether* is correct when you're discussing two options.

*If* is correct for more than 2 options.

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V: SC: Singular or Plural

The following can be singular or plural pronouns, depending on the noun it refers to:

- Some
- More
- Most
- All

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V: SC: *Less, Fewer*

*Less* = "not as much"

*Fewer* = "not as many"

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V: SC: *Compare*

Use compare to for unlike things

- "He compared her to a summer day."

Use compare with for like things

- "The police compared the forged signature with the original."

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V: SC: Comparison Words

*Like* – used to express similarity, normally between two nouns

- "Lemons are like limes."

*As* – normally used to compare two clauses, NOT two nouns

- "He looks as if he is drunk."

*Such as* – normally used to give examples.

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V: SC: *Number*

*A number* requires a plural verb.

- “A number of people are waiting for the bus.”

*The number* requires a singular verb.

- “The number of cars in the city is decreasing.”

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V: SC: Idiom

So X as to be Y

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V: SC: Idiom

Same as X as to Y

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V: SC: Idiom

Just as...so too

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V: SC: Infinitives to Avoid

*To include* is wrong.

- *Including* is correct.

*To implement* is wrong.

- *Implementing* is correct.

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V: SC: Pattern to Avoid

Avoid any sentence construction with:  
PREPOSITION + NOUN + PARTICIPLE

- “...with child-care facilities included.”  
(Incorrect)

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V: SC: *being, to be*

Avoid *being* and *to be*, if possible.

- Both forms are considered passive.

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V: SC: Idiom – Paired Coordinates

Not X, but rather Y

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V: SC: Idiom - *Target*

Target at

- “The shoe company targeted its advertising at high-school kids.”

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V: SC: Idiom

Between...and

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V: SC: *they*

Always be suspicious of the pronoun *they*.

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V: SC: Comparison of actions

Watch out for comparison of actions:

- “French wines taste better than Australian wines.” (Incorrect)

- “French wines taste better than Australian wines do.” (Correct)

- “French wines taste better than Australian wines taste.” (Correct)

- “French wines taste better than do Australian wines.” (Correct)

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## V: SC: Pronoun Rules

Each pronoun must agree in number (plural or singular) with the noun it replaces.

Each pronoun must refer directly and unambiguously to the noun it replaces.

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## V: SC: Phrase, Clause

You can change a misplaced modifier into a legal sentence by changing a phrase into a clause.

- “While leaving the bank, Evelyn’s purse was stolen.” (Incorrect, underlined portion is a phrase)

- “As she was leaving the bank, Evelyn’s purse was stolen.” (Correct, underlined portion is a clause)

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## V: SC: *-ing*

The *-ing* (present participle) form introduces an action that is simultaneous with the action of the main clause.

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## V: SC: Numbers Greater than 1

Numbers greater than 1 are plural.

- “Three out of every four automobile owners in the US also own a bicycle.”

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## V: SC: *During*

*During* + TIME PERIOD is wrong.

- “During two hours, I felt sleepy.” (Incorrect)

- “During the last two hours, I have felt sleepy.” (Correct)

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## V: SC: Quantifiers

With fractions, percentages, and indefinite quantifiers, the verb agrees with the preceding noun or clause.

With singular or non-count nouns or clauses, use a singular verb.

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V: SC: *Hopefully*

*Hopefully* is almost always wrong on the GMAT. Avoid sentence choices with this word.

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V: SC: *Having*

*Having* + past participle

- Used to express actions that are finished and to show that one thing comes after another.

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V: SC: Thinking Words

Thinking words (i.e., *theory*, *belief*, *believe*...) + *that*

- Thinking words are always followed by *that*
- “Lucy’s belief that the Earth is flat is great.” (Correct)
- “Lucy’s belief of...” (Incorrect)

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V: SC: *Credit*

Credit A with B: give responsibility for

- “Edison is credited with inventing the light bulb.”

Credit X to Y: give money or credit to

- “The bank credited \$1 million to his account.”

Credit for (noun): money received for or in exchange for something

- “The customer received a \$20 credit for the interruption of service.”

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V: SC: *Might/May*

*Might* is the past tense of *may*.

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V: SC: *Number*

“A number of” always takes plural verbs.

- “A number of people have gone...”

“The number of” always takes singular verbs.

- “The number of people has increased...”

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V: SC: Plural/Singular

QUANTIFIER + *of* + NOUN + VERB

The noun determines whether verb is singular or plural.

- “Most of the people are...”
- “Most of the water is...”

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V: SC: *Majority*

*Majority* should be used with count nouns only.

- “The majority of the talk...” (Incorrect)
- “The greater part of the talk...” (Correct)
- “The majority of the people...” (Correct)

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V: SC: *Just as*

*Just as* can replace *in the same way that*.

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V: SC: *like* vs. *as*

Use *like* when you want to focus on two nouns.

Use *as* when you want to focus on two nouns doing two actions.

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V: SC: Strategy

Whenever we have two options that are both grammatically correct, and the only difference is meaning, we **MUST** go with the original meaning.

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V: SC: be-verb

NOUN + BE-verb + NOUN/ADJECTIVE

- “The change was good for me.” (Correct)
- “The change was when I came to the U.S.” (Incorrect)
- Use “changed occurred” instead.

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V: SC: Pronoun

When you see a pronoun, especially *it*, immediately check the antecedent.

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V: SC: Idiom

*For* = “despite”

*Along with* = “in addition to”

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V: SC: *Concern*

Concerned for = “worried, anxious”

Concerned with = “related to”

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V: SC: *So, It*

*So* is used to replace a verb in a sentence.

*It* is used to replace a noun.

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V: SC: *Each*

*Each* is usually singular.

But when *each* follows a plural subject, the verb and subsequent pronouns remain in the plural.

- “Three cats each eat.” (Correct)
- “Three cats, each of which eats...” (Correct)

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V: SC: *Whether, If*

*Whether* will almost always beat *if*.

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V: SC: *Compare*

*Compare to* compares UNLIKE things, whereas *compare with* compares LIKE things.

*Compare to* is used to stress resemblance. *Compare with* can be used to show either similarity or difference (usually difference).

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V: SC: *So as to*

*So* + ADJECTIVE + *as to* + VERB

- "Her debts are so extreme as to threaten her company." (Correct)

- "He exercises everyday so as to build his stamina." (Incorrect)

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V: SC: *Due to*

*Due to* means "caused by." *Due to* does not mean "because of."

- "The game was postponed due to rain." (Incorrect)

- "The game was postponed because of rain." (Correct)

- "The game's postponement was due to rain." (Correct)

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V: SC: Idiom

Targeted at – CORRECT

Targeted to – WRONG

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V: SC: *Rather than*

Use *rather than* to express a preference.

- "I want a cat rather than a dog."

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V: SC: *Not, But*

Use *not/but* to join linguistically equivalent things.

- "Pucci is not a dog but a cat."

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V: SC: Guessing

When in doubt, choose the most concise answer.

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V: SC: Idiom

In contrast to

Similar to

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V: SC: *Between...and*

*and* must always follow *between*

- “Between raising tuition and reducing staff...”

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V: SC: *Whether/If*

*Whether* is correct when a sentence describes alternatives.

- “Whether to participate or not.”

*If* is correct when a sentence describes a hypothetical situation.

- “If he participated, he would...”

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V: SC: Modifiers

In order for a modifying phrase to be used correctly, it must be as close as possible to the thing or person it modifies.

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V: SC: END OF SC FLASHCARDS

END OF SC FLASHCARDS

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# Critical Reasoning Flashcards

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V: CR: Scope

Stay within scope of argument.

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V: CR: Find the Conclusion

The conclusion is usually found in the first or last sentence of the passage.

- Look for signposts: *therefore, hence, etc.*
- Premise words: *because, since, in view of, given that, etc.*

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V: CR: Supply your own Conclusion

In “supply your own conclusion” questions, the conclusion must be supported by ALL premises—not just one.

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V: CR: Assumption

Identify unstated premise of passage.

- Causal assumption: take an effect and suggest a cause for it.

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V: CR: Assumption

Assumptions are never stated in the passage.

- Answer choice that comes from passage is **INCORRECT**.
- Support conclusion, makes conclusion stronger.
- Look out for gaps of logic.

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V: CR: Strengthen the Argument

Find gap, fix it with additional information.

- Connect evidence with conclusion.
- Make conclusion stronger.
- Strengthen with new information.

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V: CR: Inference

Inference questions are usually very basic, about one or more premises. **PICK THE OBVIOUS ANSWER** (even if it seems too obvious).

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V: CR: Resolve the Paradox

Settle contradictory discrepancy.

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V: CR: Mimic the Reasoning

Follow same line of reasoning from the passage in the answer. Simplify the terms

- "If it rains, I will stay at home today."
- "If A, then B."

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V: CR: Strategy

Read the critical reasoning QUESTION first before reading the passage.

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V: CR: Causal Assumption

Ask whether there might be an alternative cause.

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V: CR: Analogy Assumptions

Are the two situations analogous?

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V: CR: Statistical Assumptions

Are the statistics representative?

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V: CR: Number of CR Questions

There are about 12 CR questions on the GMAT.

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V: CR: 7 Principles of CR

- 1) Understand structure of argument (identify conclusion, evidence)—look at structural signals.
- 2) Preview question before reading passage.
- 3) Paraphrase author's point.
- 4) Judge argument's persuasiveness—read actively.
- 5) Answer question being asked.
- 6) Prephrase answer.
- 7) Keep SCOPE in mind. Moderate words, qualifiers usually correct.

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V: CR: Assumption

An assumption bridges the gap between argument's evidence and conclusion.

- Use denial test.

- Compare words in evidence against conclusion.

- If you find an idea—an important word in the conclusion but not in the evidence—you found an assumption.

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V: CR: Strengthen/Weaken

Strengthen/Weaken questions are the most common CR question type on the GMAT.

- Break down piece of evidence.
- Attack validity of an assumption.
- Don't try to prove or disprove conclusion.
- Tip the scales.

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V: CR: Strengthen/Weaken

Don't be careless! Wrong answer choices often have exactly opposite of desired effect.

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V: CR: Inference

Consider the evidence, draw a conclusion.

An inference is an extension of an argument, not a necessary part of it.

Inferences need not have anything to do with conclusion.

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V: CR: 4-Step Method

- 1) Preview question stem.
- 2) Read stimulus.
- 3) Prephrase answer.
- 4) Choose an answer.

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V: CR, RC : Paraphrasing

Actively translate passages into your own words.

- Pretend you are explaining the information in a passage to a 10-year-old kid.

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V: CR: Weaken/Strengthen

When you compare two items, you must be sure that the two items are indeed comparable.

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V: CR: Strategy

Identify the conclusion and find the answer that addresses the conclusion. Most questions follow this guideline.

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V: CR: Assumption

For assumption questions, find the conclusion and determine which answer choice needs to be true for a conclusion to be valid.

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V: CR: Irrelevant

Watch for irrelevant answer choices in CR.  
- Stay within SCOPE!

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V: CR: Negate

For assumption questions, negate CR answer choice to see if the conclusion can survive.

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V: CR: Inference

For inference questions, determine which answer choice must absolutely, positively be true based on what you've read.  
- Pick the obvious answer choice.  
- Avoid extremes.

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V: CR: Statistics

When an argument is based on statistics, it is usually assumed that the people polled are representative of the whole.

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V: CR: Indicate Flaw

Use the information that is present in the passage to answer "Indicate the Flaw" CR questions.  
- Not about new information like "Weaken" CR questions.

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V: CR: Prephrase

Prephrase an answer before looking at the actual answer choices.

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V: CR: Inferences

Inferences pertain to one or more premises.  
- Pick the obvious.

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V: CR: Scope Shifts

Be wary of scope shifts.

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V: CR: Questions involving Surveys

Consider: Does the survey accurately represent the views of the whole group surveyed?

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V: CR: Evaluate the Argument

Test relevance.

Determine which a choice helps to determine whether a conclusion is valid.

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V: CR: Explanation

With explanation questions, reconcile the facts presented.  
- Stay within scope.

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V: CR: Weaken

2 most common ways to weaken an argument:  
- Break down central assumption.  
- Assert alternative possibilities relevant to the argument.

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V: CR: Numbers, Percentages

V: CR: END OF CR FLASHCARDS

Watch for the distinction between NUMBERS  
and PERCENTAGES.

END OF CR FLASHCARDS

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# Reading Comprehension Flashcards

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## V: RC: Analyzing RC Passage

WHY is the author writing?

WHAT is being said?

HOW does the author accomplish his goal?

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## V: RC: Types of Questions

Two types of RC questions:

- General
- Main idea, Structure
- Specific

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## V: RC: Signposts

Watch for trigger words.

- *however, but, etc.*
- Trigger words change tone, direction of a passage.

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## V: RC: Yin-Yang

Yin words:

- *Generally, the old view, the widespread belief, most scientists think, on the other hand, etc.*

Yang words:

- *However, but, etc.*

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## V: RC: Inference

GMAT inferences go only a tiny bit further than what is said in the passage.

- Eliminate exaggerations, offensive words, extreme words.

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## V: RC: Indisputable Answers

The answer choice that is high specific and unequivocal is usually wrong.

- VAGUE AND GENERAL answers are best.
- Words like *perhaps* and *may*.

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V: RC: Indisputable Words

Nice vague words

- *usually, sometimes, may, can, some, most*

Too unequivocal—BAD!

- *always, most, everybody, all, complete, never*

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V: RC: Respect

ETS respects professionals, America.

- Avoid disparaging answers.
- Respectful answers about minorities always.
- No prejudiced answers.

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V: RC: Strong emotions

Avoid strong emotions.

- Avoid words like: *scornful, envious, overly enthusiastic, resolve*, etc.

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V: RC: Strategy

Be mindful of:

- Topic
- Scope—narrowing of topic
- Author's purpose
- Structure
- Author's voice—fact from opinion

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V: RC: Roadmap

Make mental roadmap of passage.

- Get a sense of the paragraph, argument structure.

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V: RC: Main Idea

Thesis: personal interpretation bolstered by evidence.

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## V: RC: Global Questions

Stay within topic and scope.

Recognize author's overall intentions, idea, passage structure, purpose.

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## V: RC: Scope

Scope is the entire passage.

- Nouns and verbs must be consistent with tone/scope.

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## V: RC: Inference

Two types of inferences:

- Regular inference.
- Agreement: "Author/Character/Group would agree with..."

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## V: RC: Logic

Why the author does something:

- Cites a source
- Brings up detail
- Structure

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## V: RC: Explicit Detail

For explicit detail questions, the answer can be pinpointed in the text.

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## V: RC: Strategy

- 1) Read actively and don't skim.
- 2) Create a mental roadmap: label paragraphs, look for signal words.
- 3) Synthesize.
- 4) Attack questions.

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V: RC: Scope

Scope is the aspect of the topic (subject matter) that the author discusses in the passage.

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V: RC: Focus

Focus on ideas, not facts.

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V: RC: Inference

Suggested by passage.

Wrong answers:

- Distort ideas
- Superfluous
- Contradictory
- Outside of scope

With inference questions, be sure to see whether the attitude of passage is positive, negative, or neutral.

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V: RC: Anticipate

Anticipate what's next by looking for key words.

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V: RC: Qualify

To qualify a claim is to weaken or soften it.

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V: RC: Anticipation—Supporting, Continuing Point

Additional points: *furthermore, in addition, also, to.*

Additional examples: *similarly, likewise, for example.*

Structure: *secondly, thirdly.*

Conclusions: *thus, therefore, in conclusion.*

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## V: RC: Contrary Words

- *although, though, even though*
- *but*
- *despite, in spite of*
- *except*
- *however, nevertheless*
- *unless*
- *while*

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## V: RC: Strategy

A strategy for RC:

- Read for author's purpose and main idea.
- Paraphrase the text.
- Create an outline, roadmap of passage.
- Don't over invest.
  - 4 min. on reading, 1 min. on question.
- Read explanations.

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## V: RC: Main Idea

Keep searching for the main idea of a passage!

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## V: RC: General Questions

Decoy answers for general RC questions are:

- Too specific
- Too broad
- Too extreme
- Not relevant

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## V: RC: Specific Questions

Decoy answers for specific RC questions:

- Refer to wrong part of passage
- Make sense but are not mentioned in passage
- Refute passage directly
- Stray away from passage

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## V: RC: Strengthen/Weaken

Decoy answers for strengthen/weaken questions:

- Out of scope
- Weaken instead of strengthen, vice versa
- Logical answer but not mentioned or supported in passage

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## V: RC: How to Spot a Good Answer

A good answer:

- Paraphrases text
- Nice, respectful
- Not extreme

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## V: RC: Good Words for RC Answer Choices

- *some, many*
- *often*
- *sometimes, rarely usually*
- *can, could, may, might*
- *some people*
- *few people*
- *more, less*
- *likely, possibly*
- *doubtful, unlikely*

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## V: RC: Words to Avoid in RC Answer Choices

- *all*
- *always*
- *never*
- *will*
- *everyone, everybody*
- *no one, nobody*
- *most, least*
- *absolutely*
- *impossible*

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## V: RC: Topic and Scope

Always be mindful of TOPIC and SCOPE.

- Topic and scope can often be determined in the first paragraph of a passage. Write them down as soon as you find them on your scrap paper.

- Topic
  - General subject
  - Examples: stars, industrial safety
- Scope
  - Narrowing of topic
  - Examples: logistics of space travel to Mars; analysis of industrial regulations in different historical eras

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## V: RC: Hard Details

Note the location and purpose of intricate details, but do not attempt to memorize or even fully understand those details unless a question specifically asks about them.

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## V: RC: Purpose, Main Idea

Be mindful of author's PURPOSE and MAIN IDEA.

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V: RC: Inference

With inference questions, do not prephrase.

- Go right to answer choices and make your judgment.

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V: RC: Distinction

Pay attention to a distinction in a passage that compares two or more people, theories or phenomena.

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V: RC: END OF RC FLASHCARDS

END OF RC FLASHCARDS

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# Quantitative Flashcards

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Q: Steps to Solve

Medium questions require 2 steps to solve.

Difficult questions require at least 3 steps.

The GMAT begins with a medium question.

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Q: PS: Backsolving Strategy

Start with Choice (E) and work back to (A)  
when backsolving from the answer choices.

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Q: Assuming

Don't assume a number is an integer unless  
explicitly told so.

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Q: Multiple

Multiples of 3:  
- 3, 6, 9...

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Q: How to check whether number is multiple of 3

Sum of digits is multiple of 3.

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Q: How to check whether number is multiple of 4

Last two digits is multiple of 4.

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Q: How to check whether number is multiple of 6

Number is multiple of 3 and 2.

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Q: How to check whether number is multiple of 9

Sum of digits is multiple of 9.

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Q: How to check whether number is multiple of 12

Sum of digits is multiple of 3, last two digits multiple of 4.

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Q: Common Factor

Break down both numbers to their prime factors to see what factors they have in common. Multiply shared prime factors to find all common factors.

- What factors greater than 1 do 135 and 225 have in common?

$$135 = 3 \times 3 \times 3 \times 5$$

$$225 = 3 \times 3 \times 5 \times 5$$

Both share  $3 \times 3 \times 5$  in common—find all combinations of these numbers:

$$3 \times 3 = 9; 3 \times 5 = 15; 3 \times 3 \times 5 = 45$$

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Q: Simple Probability

$(\# \text{ of favorable outcomes}) / (\# \text{ of possible outcomes})$

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Q: Gross Profit

Gross profit = Selling Price - Cost

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#### Q: Combined Events

For events E and F:

- not E =  $P(\text{not E}) = 1 - P(E)$
- E or F =  $P(E \text{ or } F) = P(E) + P(F) - P(E \text{ and } F)$
- E and F =  $P(E \text{ and } F) = P(E)P(F)$

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#### Q: Combinations

If order of selection is not relevant and only  $k$  objects are able to be selected from a larger set of  $n$  objects:

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

$$\binom{n}{k} = \binom{n}{n-k}$$

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#### Q: Permutations

Counting the number of ways that a set of objects can be ordered:

- $n!$

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#### Q: Multiplication Principle

The number of ways independent events can occur together can be determined by multiplying together the number of possible outcomes for each event.

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#### Q: Multiplication Principle

If a first object may be chosen in  $m$  ways and a second object may be chosen in  $n$  ways, then there are  $mn$  ways of choosing both objects.

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#### Q: 1<sup>st</sup> Rule of Probability

Basic rule: The probability of event A occurring is the number of outcomes that result in A divided by the total number of possible outcomes.

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### Q: 2<sup>nd</sup> Rule of Probability

Complementary Events: The probability of an event occurring plus the probability of the event not occurring = 1.

$$- P(E) = 1 - P(\text{not } E)$$

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### Q: 3<sup>rd</sup> Rule of Probability

Conditional Probability: The probability of event A AND event B occurring is the probability of event A times the probability of event B, given that A has all ready occurred.

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### Q: Dependent Events

Two events are said to be dependent events if the outcome of one event affects the outcome of the other event.

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### Q: 4<sup>th</sup> Rule of Probability

The probability of event A OR event B occurring is the probability of event A occurring plus the probability of event B occurring minus the probability of both events occurring.

$$- P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

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### Q: Probability of Multiple Events

- $A \text{ and } B < A \text{ or } B$
- $A \text{ or } B > \text{Individual probabilities of } A, B$
- $P(A \text{ and } B) = P(A) \times P(B) \leftarrow \text{“less options”}$
- $P(A \text{ or } B) = P(A) + P(B) \leftarrow \text{“more options”}$

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### Q: Indistinguishable Events

To find the number of distinct permutations of a set of items with indistinguishable items, divide the factorial of the items in the set by the product of the factorials of the number of indistinguishable elements.

- How many ways can the letters in TRUST be arranged?

$$\frac{5!}{2!} = 60$$

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#### Q: Circular Permutations

The number of ways to arrange  $n$  distinct objects along a fixed circle is:  $(n - 1)!$

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#### Q: Probability and Geometry

If a point is chosen at random within a space with an area, volume, or length of  $Y$  and a space with a respective area, volume, or length of  $X$  lies within  $Y$ , the probability of choosing a random point within  $Y$  is the area, volume, or length of  $X$  divided by the area, volume, or length of  $Y$ .

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#### Q: Multiple Event Probability

To determine multiple-event probability where each individual event must occur in a certain way:

- Figure out the probability for each individual event.
- Multiply the individual probabilities together.

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#### Q: Trial Problems

Look at the probability of NOT OCCURRING.

- $P(\text{Event Not Occurring}) = 1 - P(\text{Event Occurring})$

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#### Q: Combinations: Order doesn't matter

$$\frac{n!}{r!(n-r)!}$$

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#### Q: Permutations: Order matters

Number of permutations of  $r$  objects from a set of  $n$  objects:

$$\frac{n!}{(n-r)!}$$

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Q: Number Added or Deleted

Use mean to find number that was added or deleted.

- Total = mean  $\times$  (number of terms)
- Number deleted = (original total) – (new total)
- Number added = (new total) – (original total)

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Q: Odd Factors

Odd numbers have only odd factors.

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Q: Purchase Price vs. Market Value

Remember: purchase price is not the same as market value.

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Q: Quadratic Formula

To find roots of quadratic equation,  $ax^2 + bx + c = 0$ :

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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Q: Exponents

$$(x^a)(y^a) = (xy)^a$$

$$(3^3)(4^3) = 12^3 = 1728$$

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Q: Highest Common Factor (HCF), Lowest Common Multiple (LCM) – Prime Factorization

1. Start by writing each number as product of its prime factors.
2. Write so that each new prime factor begins in same place.
3. Highest Common Factor is found by multiplying all factors appearing on BOTH lists.

$$60 = 2 \times 2 \times 3 \times 5$$

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

$$\text{HCF} = 2 \times 2 \times 3 = 12$$

4. Lowest common multiple found by multiplying all factors in EITHER list.

$$60 = 2 \times 2 \times 3 \times 5$$

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

$$\text{LCM} = 2 \times 2 \times 2 \times 3 \times 3 \times 5 = 360$$

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Q:  $rt = d$

For a fixed distance, the average speed is inversely related to the amount of time required to make the trip.

- Since Miekko's average speed was  $\frac{3}{4}$  of Chan's, her time was  $\frac{4}{3}$  as long.

$$- rt = d$$

$$- \left(\frac{3}{4}\right)r\left(\frac{4}{3}\right)t = d$$

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Q: Factor Out

$$5^k - 5^{(k-1)}$$

$$5^k - \left(\frac{1}{5}\right)5^k$$

$$\left(1 - \left(\frac{1}{5}\right)\right)5^k$$

$$\left(\frac{4}{5}\right)5^k$$

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Q: Check for Prime

1. Pick a number  $n$ .
2. Start with the least prime number, 2. See if 2 is a factor of your number. If it is, your number is not prime.
3. If 2 is not a factor, check to see if the next prime, 3, is a factor. If it is, your number is not prime.
4. Keep trying the next prime number until you reach one that is a factor (in which case  $n$  is not prime), or you reach a prime number that is equal to or greater than the square root of  $n$ .
5. If you have not found a number less than or equal to the square root of  $n$ , you can be sure that your number is prime.

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Q: Backsolving Strategy

When answer choices have variables in them, start from the LAST choice and work back to the first.

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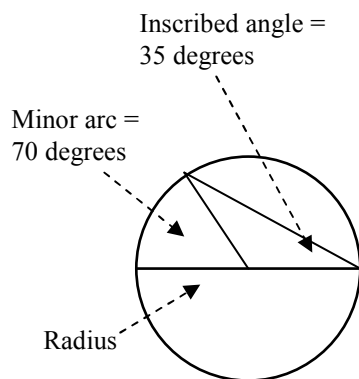
Q: Squaring Fractions

When positive fractions between 0 and 1 are squared, they get smaller.

$$- \left(\frac{1}{4}\right)^2 = \left(\frac{1}{16}\right)$$

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Q: Inscribed Angle, Minor Arc



$$\text{Minor arc} = 2 \times (\text{inscribed angle})$$

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Q: Evenly Divisible Problem

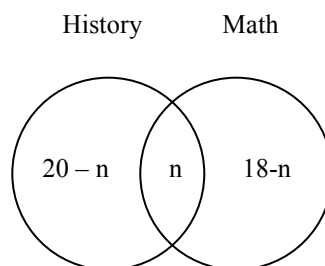
To determine the number of integers less than 5000 that are evenly divisible by 15:

- Divide 4999 by 15  $\Rightarrow$  333 integers

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Q: Set Problem

Each of 25 people is enrolled in history, math, or both. If 20 are enrolled in history and 18 are enrolled in math, how many are enrolled in both?



$$(20 - n) + n + (18 - n) = 25$$

$$\Rightarrow n = 13$$

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Q: Interest Problem

If \$10,000 is invested at 10% annual interest, compounded semi-annually, what is the balance after 1 year?

$$10,000 + (10,000)(0.05) = 10,500$$

$$\Rightarrow 10,500 + (10,500)(0.05) = \$11,025$$

OR

$$10,000(1 + (0.10/2))^2 = \$11,025$$

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Q: Mixture Problem

How many liters of a solution that is 15% salt must be added to 5 liters of a solution that is 8% salt so that the resulting mixture is 10% salt?

$$0.15n + 0.08(5) = 0.1(n + 5)$$

$$15n + 40 = 10n + 50$$

$$5n = 10 \Rightarrow n = 2 \text{ liters}$$

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Q: Area of a Trapezoid

$$\frac{1}{2}(\text{sum of bases})(\text{height})$$

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Q: Rules of Exponents

$$x^{\frac{r}{s}} = \left(x^{\frac{1}{s}}\right)^r = \sqrt[s]{x^r}$$

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Q: Always Try to Factor!

$$x^3 - 2x^2 + x = -5(x - 1)^2$$

$$x(x^2 - 2x + 1) = -5(x - 1)^2$$

$$x(x - 1)^2 + 5(x - 1)^2 = 0$$

$$(x + 5)(x - 1)^2 = 0$$

$$x = -5, 1$$

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Q: Intersecting Sets

$$|A \cup B| = |A| + |B| - |A \cap B|$$

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Q: Standard Deviation of  $n$  Numbers

1. Find arithmetic mean.
2. Find differences between mean and each of the  $n$  numbers.
3. Square each of the differences.
4. Find average of squared differences.
5. Take non-negative square root of this average.

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Q: Consecutive Integers

$$\text{Even: } 2n, 2n + 2, 2n + 4$$

$$\text{Odd: } 2n + 1, 2n + 3, 2n + 5$$

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Q: Prime Number

A prime number is a positive integer that has exactly two different positive divisors: 1 and itself.

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Q: Zero is Even

Zero is an even integer.

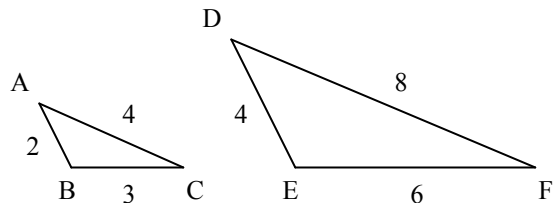
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Q: Percent Increase vs. Percent of

Be careful about percent increase vs. percent of.

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Q: Geometry: Similar Triangle Areas

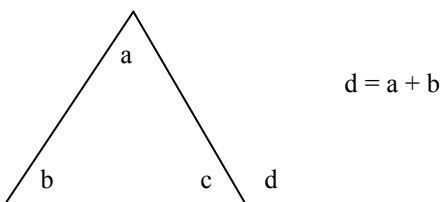


The ratio of the areas of two similar triangles is the square of the ratio of corresponding lengths.

- Each side of triangle DEF is 2 times the length of corresponding triangle ABC
- Triangle DEF must have  $2^2$ , or 4, times the area of triangle ABC.

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Q: Geometry: Triangles



Exterior angle  $d$  is equal to the sum of the two remote interior angles  $a$  and  $b$ .

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Q: Gross vs. Net

Gross is the total amount before any deductions are made.

Net is the amount after deductions are made.

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Q: Use FOIL Method with Quadratics with Roots

$$n - 4(\text{sq. root } n) + 4 \Rightarrow ((\text{sq. root } n) - 2)((\text{sq. root } n) - 2)$$

↓

$$x^2 - 4x + 4$$

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Q: Useful Percents to Know

$$1/8 = 12.5\%$$

$$1/6 = 16.6\%$$

$$5/6 = 83.3\%$$

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### Q: Odd and Even

$$\text{Odd} + \text{Odd} = \text{Even}$$

$$\text{Even} + \text{Even} = \text{Even}$$

$$\text{Odd} + \text{Even} = \text{Odd}$$



Any addition involving an odd number creates an odd sum.

$$\text{Odd} \times \text{Odd} = \text{Odd}$$

$$\text{Even} \times \text{Even} = \text{Even}$$

$$\text{Odd} \times \text{Even} = \text{Even}$$



Any multiplication involving an even number creates an even product.

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### Q: Simplify Base

Always try to simplify the base.

- If  $27^n = 9^4$ , then  $n =$

$$(3^3)^n = (3^2)^4 \Rightarrow n = 8/3$$

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### Q: Powers and Roots

To multiply one radical by another, multiply or divide the numbers outside the radical signs, then the numbers inside the radical signs.

$$6(\text{sq.rt. } 3) \times 2(\text{sq.rt. } 5) = (6 \times 2)(\text{sq.rt. } 3 \times \text{sq.rt. } 5) = 12(\text{sq.rt. } 15)$$

$$(12(\text{sq.rt. } 15))/2(\text{sq.rt. } 5) = (12/2)(\text{sq.rt. } 15/\text{sq.rt. } 5) = 6(\text{sq.rt. } 3)$$

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### Q: Percentage

To make a percentage, multiply by 100%:

$$- 1/400 = 1/4\% = 0.25\%$$

To drop a percent, divide by 100%:

$$- 1/2\% \times 1/100 = 1/20,000$$

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### Q: Averages

Think of averages as balancing.

- The average of 3, 4, 5, and  $x$  is 5. What is  $x$ ?

3 is 2 less than 5

4 is 1 less than 5

5 is the average.

$$x = 5 + 3 = 8$$

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### Q: Divisors

You can find all the divisors of a number by finding all the prime factors.

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Q: Factor Out and Simplify

Immediately try factoring/simplifying when possible.

- Is  $(2x + 24)/6$  an integer?

$$\Rightarrow 2x/6 + 24/6$$

$$\Rightarrow x/3 + 4$$

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Q: Volume of a Sphere

$$(4/3)\pi r^3$$

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Q: Sum of Angles in a Regular Polygon

Sum of interior angles in a polygon with  $n$  sides:

$$180(n - 2)$$

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Q: Multiple Event Probability

2 things to do:

- Find the total number of possible outcomes.
- Find the number of desired outcomes.
- Write them out if necessary.

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Q: Group Problems Involving *Either/Or*

Some GMAT word problems involve groups with distinct “either/or” categories (male/female, blue collar/white collar, etc.). The key is to organize the information into a grid.

	Doctors	Dentists	Total
Male	55	27	82
Female		9	48
Total	48	36	130

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Q: Group Problems Involving *Both/Neither*

MIXED GROUP FORMULA:

$$\text{Group}_1 + \text{Group}_2 + \text{Neither} - \text{Both} = \text{Total}$$

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#### Q: Balancing Method for Mixtures/Dilutions

(percent/price difference between weaker solution and desired solution) x (amount of weaker solution) =  
(percent/price difference between the stronger solution and desired solution) x (amount of stronger solution)

Ex. How many liters of a solution that is 10% alcohol by volume must be added to 2 liters of a solution that is 50% alcohol by volume to create a solution that is 15% alcohol by volume?

$$- n(15 - 10) = 2(50 - 15)$$

$5x = 2(35) \Rightarrow n = 70/5 \Rightarrow 14$  liters of 10% solution must be added.

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#### Q: Average Rate

$$\text{Average A per B} = (\text{Total A})/(\text{Total B})$$

$$\text{Average Speed} = (\text{Total Distance})/(\text{Total Time})$$

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#### Q: Added, Deleted

Number added: (new sum) – (original sum)

Number deleted: (original sum) – (new sum)

Ex. The average of 5 numbers is 2. After one number is deleted, the new average is –3. What number was deleted?

$$\text{Original sum: } 5 \times 2 = 10$$

$$\text{New sum: } 4 \times (-3) = -12$$

$$\text{Number deleted} = 10 - (-12) = 22$$

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#### Q: A Common Digits Problem

$$\begin{array}{r} \text{AB} \\ + \text{BA} \\ \hline \text{CDC} \end{array} \Rightarrow \begin{array}{r} 47 \\ + 74 \\ \hline 121 \end{array} \quad \text{or} \quad \begin{array}{r} 83 \\ + 38 \\ \hline 121 \end{array}$$

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#### Q: Compound Interest

Usually you don't need to calculate compound interest. Try finding simple interest and looking for the answer that is a little bit larger.

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#### Q: Compound Interest

$$(\text{final balance}) = (\text{principal}) \times (1 + (\text{interest})/C)^{[(\text{time})(C)]}$$

C = the number of times compounded annually

If \$10,000 is invested at 8% annual interest, compounded semiannually, what is the balance after 1 year?

$$\begin{aligned} - \text{Final balance} &= (10,000)(1 + (0.08)/2)^{[(1)(2)]} \\ &= 10,000 \times (1.04)^2 \\ &= \$10,816 \end{aligned}$$

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Q: Simple Interest

Simple interest = (principal)(interest rate)(time)

                  ↑          ↑  
          decimal  years

If \$12,000 is invested at 6% simple annual interest, how much interest is earned after 9 months?

$$- (\$12,000)(0.06)(9/12) = \$540$$

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Q: Factorial of Zero

$$0! = 1$$

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Q: Sum of Consecutive Numbers

$$\text{Sum} = (\text{average})(\text{number of terms})$$

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Q: Count Consecutive Numbers

Number of integers from A to B inclusive =  $B - A + 1$

Ex. How many consecutive integers are there from 73 through 419, inclusive?

$$419 - 73 + 1 = 347$$

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Q: Average of Consecutive Answers

The average of a set of evenly spaced consecutive numbers is the average of the smallest and largest numbers in the set.

- Ex. What is the average of all integers from 13 to 77?

$$(13 + 77)/2 = 90/2 = 45$$

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Q: Percent

15 is  $\frac{3}{5}$  percent of what number?

$$\frac{3}{5} \text{ percent} = \frac{3}{500}$$

$$15 = (\frac{3}{500}) \times \text{whole}$$

$$\text{whole} = 2500$$

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### Q: Work Problems

Consider work done in one hour.

Inverse of the time it takes everyone working together =  
Sum of the inverses of the times it would take each  
person working individually.

Ex. You have worker A and worker B doing a job:

$$\frac{1}{A} + \frac{1}{B} = \frac{1}{T}$$

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### Q: PS: Guessing

If you have to guess in a problem solving  
question, go with (D) or (E).

- Especially with problems that force you to  
use or plug in the answer choices.

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### Q: Prime Numbers

1 is not a prime number.

The first eight prime numbers are:

- 2, 3, 5, 7, 11, 13, 17, 19

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### Q: Simple Compounding

$$A = P(1 + r)^n$$

A = amount accumulated

P = principal

r = annual rate of interest

n = number of years

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### Q: Factors

Factors of 18: 1, 2, 3, 6, 9, 18

Factors of 6: 1, 2, 3, 6

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### Q: Slope

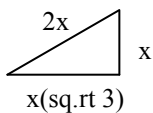
$$y = mx + b$$

m = slope = (difference in y coordinates) /  
(difference in x coordinates)

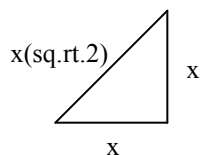
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### Q: Triangles

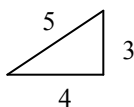
30-60-90



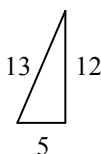
45-45-90



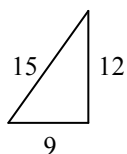
3-4-5



5-12-13



9-12-15



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### Q: Approximations

Square root of 2 = 1.4

Square root of 3 = 1.7

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### Q: Quadratics

$$(x + y)^2 = x^2 + 2xy + y^2$$

$$(x + y)(x - y) = x^2 - y^2$$

When you see an equation in factored form in a question, immediately UNFACTOR it; vice versa.

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### Q: Equation Rule

You must have as many equations as you have variables for the data to be sufficient.

Ex. What is the value of  $y$ ?

Given:  $x + y = 1$

$\Rightarrow$  insufficient without another distinct equation

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### Q: DS: Insufficient

Half the time statements (A) and (B) are both insufficient.

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### Q: DS: Rephrase

A good data sufficiency strategy is to rephrase the information in a question:

Ex.  $z + z < z$ ?

$\Rightarrow z < 0$ ?

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Q: DS: What is Being Asked?

In Data Sufficiency questions, you are usually being asked 1 of 3 things:

1. A specific value.
2. A range of numbers
3. Yes/No

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Q: DS: Strategy

Immediately write out the DS problem type (value, range, yes/no) on your scratch paper before you begin a DS problem.

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Q: DS: Strategy

1. Focus on the question stem—thinking about the information needed to answer the question.
2. Look at each stem separately.
3. Look at both statements in combination.
  - Half of the DS answers on the GMAT come down to step 3.

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Q: DS: First DS Questions

Calculate out the first DS questions to make sure they are correct. It is important to start out the section strong.

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Q: DS: Hard Questions

Skip statements that you do not understand.

- Eliminate as much as possible.

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Q: DS: Hard Questions

On harder DS questions, answer choices tend to be more sufficient than they might appear.

- DON'T CHOOSE (E) if you have to guess.
- Pick between (A) or (C), if you can eliminate (B).
- Historically, (A) is slightly more common as the right answer.

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Q: DS: Yes/No

About 1/3 of DS questions are YES/NO questions.

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Q: DS: Looking at Both Statements Together

Only about half the time do you have to look at both statements in combination.

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Q: DS: Common Trap

Do NOT use the information in one statement as an assumption in the second statement.

- Statements are not necessarily related.
- View separately!

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Q: DS: Sufficiency in YES/NO Questions

On YES/NO DS questions, if a statement answers the question conclusively in the affirmative or in the negative, then IT IS SUFFICIENT.

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Q: DS: Equations

To achieve sufficiency, there must be as many equations as there are variables.

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Q: DS: Strategy

**AD or BCE**

If you can determine that choice (A) is correct in your DS question, then you know that the ultimate answer must be either (A) or (D).

If you can determine that choice (A) is not correct in your DS question, then you know that the ultimate answer must be (B), (C), or (E).

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Q: END OF QUANTITATIVE FLASHCARDS

END OF QUANTITATIVE FLASHCARDS

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