Study Guide Zone

FCAT Test Study Guide

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Reading

The Reading test measures a test taker's ability to understand, analyze and evaluate written passages. The passages will contain material that will be from a variety of sources and on a number of different topics.

Each of the passages and statements in the Reading test will be followed by a series of questions covering the content of the passage or statement, in which you will have to answer questions, which will demonstrate how well you understand the passages and are able to draw conclusions about the material.

Strategy 1: Flying Over the Passage

A topic that is hotly debated among test taking circles is whether or not you should read the reading passages before you read the question. One theory is that you can save time if you read the questions first and then go back and read over the passage. Another theory is that you should read the passage first and then go into the questions. Both theories have their own individual merit and due to the differences in ability and preferences among test takers, one method may work better than another for you.

Our recommended theory is the flyover. You want to spend some time on the passage, at a bare minimum so that you have a general idea about what the questions are going to ask and get your mind into the proper mindset for the series of questions. However, you don't want to waste too much time on reading the passage, because much of the

detail will be forgotten by the time you get to the questions anyway. Therefore, you should fly over the passage. You should read it very quickly for a high-level overview (hence the flyover) understanding of what is contained in the passage.

In part, this is a compromise between the theories that gains most of the benefits of each. You won't waste time on the details and yet will have a general idea of what the passage is about and what to expect.

Strategy 2: Creating a Tentative Summary

After you've finished your flyover of the passage, take a few seconds and compose a tentative mental summary of what you've just read. Try to sort out the details you picked up on and arrange them into a loose organizational pattern that describes the passage. Remember that your goal in the flyover is not to check it off of a test-taking list of things to do. You want there to be some purpose behind the flyover and having the definite goal of being able to put together a brief mental summary will allow you to maintain some focus and gain benefit from the flyover – as opposed to just skimming it for the sake of skimming it without actually picking up on anything.

As you begin going through the questions and answer choices, if you get good enough at putting together your mental summaries from practice, you should be able to eliminate a number of answer choices that are immediately contrary to your summary. Note, however that if you find yourself without any good answer choices remaining (because you've eliminated them all) you obviously had to have eliminated the right answer choice. Don't hesitate to reopen an answer choice that

you've already "eliminated" from consideration and reconsider it as a possibility. If you think an answer choice contradicts your initial summary, you're probably right, but are not infallible.

Strategy 3: Openings and Endings

A main focus of this flyover will be the opening and ending sentences in each paragraph. These are likely to contain the main ideas of the paragraphs and should be mentally tagged for future reference. Try to remember a vague idea of what the different paragraphs are about, because this will save you time when answering questions later.

For the most part, make sure you never try to just answer the questions from this first flyover. Always try to go back and confirm the answer, as your memory will play tricks on you and the writers of the test questions may deliberately have planted a trap for you – remember that they don't exactly have your best interests at heart.

Strategy 4: Using Kitchen Logic

When a question asks the test taker to identify a main idea, you should first focus on the opening and ending sentences of the passage and each individual paragraph. If you can't find the main idea from these key sentences, then ask yourself how you would describe the passage to someone who had never read it. Which words and phrases would you use to explain the principle ideas of the passage?

This is called "Kitchen Logic" - when you explain something the way you would if you were talking to your friends and family, while sitting

at your kitchen table. So, when faced with identifying the main idea of a difficult passage, make it easier on yourself by backing away from the passage and thinking about it in terms of using easy “kitchen logic”.

Strategy 5: Getting into the Author’s Mind

A number of questions become much easier when you place yourself into the mind of the author of the passage. Ask yourself a few different questions:

“Why did the author write this passage?”
“What was the author trying to say?”
What angle is the author taking?”
“What is the single most important point the author is trying to make?”

Put yourself in the shoes of the author and imagine that you wrote the passage and try to identify what you were trying to describe and how you were trying to describe it. If you take on the opinions and ideas expressed by the author as your own, then it becomes easier to answer questions that would be easy for the author to answer.

Strategy 6: Emotional Words

Each question will be about a different angle of the passage. For questions asking about the author’s emotions, find words in the passage that are adjectives describing emotions.

So, if a question asks what sort of attitude an author had towards the passage or subject, then look throughout the passage for attitude words that might convey a positive or negative attitude. Are words such as brilliant, excited, delightful used, or are words such as depressive, gloomy, disappointing used?

A lot of questions could be answered correctly simply by going through and circling all the adjectives in a passage. Without looking at anything else except for the adjectives in a passage, most questions about attitude or emotion could be answered correctly.

Another way of handling these situations is to arrange all of the answer choices in a list going from most negative to most positive.

Example:
Question: The author's attitude on this topic is best described as:

A. indignation
B. eagerness
C. impartiality
D. fear

Now arrange these in order from negative to positive:
(-) indignation, fear, impartiality, eagerness (+)

This will help sort out the different choices and keep you from overlooking an answer choice and making an easy mistake.

Strategy 7: Finding the Key Words

The strategy of finding certain “give-away” words does not only apply to adjectives in questions about emotions or attitude. Many questions about specific details will have key words that hold the “key” to finding the right part of the passage to look in for the answer.

Rather than answering based on your memory of the passage, you always want to have support for your answer choice rooted in a specific part of the passage. To gain that support, it follows that you have to identify which part of the passage to look in. While reading back over the entire passage may be the most foolproof method of finding that important part of the passage, it definitely is not the most time economical method of finding that part of the passage.

A better route is to find key words in the question or answer choices that are likely to stand out in the passage and will enable you to quickly narrow your search down. These key words will be nouns or verbs in the question or answer choices. Once you’ve identified possible key words, then you should scan through the passage quickly looking for either those key words to be repeated in the passage, or their synonyms to appear in the passage. Once you find a particular part of the passage that either has the exact key word repeated or a synonym of the key word, you have probably identified the particular part of the passage that will contain the support or justification that you need to correctly answer the question and will allow you to be confident in your answer choice selection.

One warning that should be made here is that often question writers may use the exact same word or wording in their answer choices that are used in the passage, but have done so in such a way as to mislead

you. So, simply because a particular word or phrase appears in an answer choice and also appears exactly the same in a passage does not make that answer choice correct. Be sure that you reread the answer choice and consider the context that it is in, to ensure that you are not misled by a cheap trick.

In conclusion, always try to connect the question to the right words in the passage that will allow you to save time in finding the right part of the passage to look in for the answer and will give you the key to the correct answer choice.

Strategy 8: Making Proper Inferences

Questions that ask you to make an inference from the passage will require you to use your own personal judgment. Anything directly stated by the author is not an inference. You will need to understand the main idea of the passage in order to make a proper inference about the author's intent and mindset.

The obvious will not be enough to answer an inference question. You must logically deduce what follows from what the author has stated in the passage. You are looking for what can be inferred by the passage, not what is directly stated in the passage.

Strategy 9: Applying Ideas for Generalizations

Generalization questions are similar to inference questions in that you have to go beyond what is directly stated in the passage by the author. It helps to put yourself again in the author's shoes. If you were the author and believed in what you had just written, how would you feel about another similar situation? What would either strengthen or weaken your argument. How would you apply the information you have just expressed to a completely different situation?

Strategy 10: Using Context Clues

Context clues are a valuable aide in helping you understand difficult phrases or words in the passage. A number of questions will ask you about the meaning of words as they are used in a given passage.

If you already know the definition of the word, or have some familiarity with it, a common mistake is to go with your first impulse and choose the answer that you immediately recognize. However, the reason the test writers may have chosen that particular vocabulary word is because it is used in an unusual context. Therefore, return to the passage and find where the word is used and make sure that you understand how it is being used in the passage.

Once you've made your choice of a good definition go back again to the passage and reread that particular section, but mentally replace the answer choice you've chosen for the word being asked about.

Example:
A passage states: “He was notorious for making decisions on the spur of the moment…”

Question: Which of the following words, if substituted for the word “notorious” would introduce the LEAST change in the meaning of the sentence?

A. evil
B. disturbed
C. famous
D. despised

If you knew that the most common definition for “notorious” meant being known in an unfavorable sense, then you might be tempted to choose choice A, “evil.”

But once you review back over the passage, choice C, “famous” fits in better into the context of the sentence of passage. Read the sentence again and substitute your chosen answer choice for the word it replaces. This gives you:

““He was famous for making decisions on the spur of the moment…,” which makes sense and is correct.

Strategy 11: Breaking Down Passage Organization

In trying to understand the author’s perspective, you will sometimes be asked about how the passage is organized. Many times, the

simplest way to find the answer is to note how the opening sentence in a passage or paragraph relates to the rest of the passage. How does the author's main idea get developed and broken down into supporting ideas and statements?

As you go through the answer choices for these organization problems, quiz yourself on each answer choice.

Example:
Question: Which of the following best describes the organization of the author's discussion of this topic?

A. He provides an example – Ask yourself, is there an example in the question? Don't work exclusively from your memory. Make sure you can go back and actually find the example in the passage.
B. He makes a comparison – Ask yourself, is there a comparison in the question? Again, go back to the passage and actually find the comparison being made and verify that it exists.
C. He makes an acknowledgement – Ask yourself, where is the acknowledgement made and to whom?
D. He discusses a theory – Ask yourself, which theory is being discussed?

After each of these initial questions, remember that it is not enough for them simply to be true, they have to answer the question. Simply because the author provided an example, doesn't make choice A correct. The example provided may have been to support a comparison that he was making and the comparison may be the main method of organization, which in this case would make answer choice

B correct. So always read all the answer choices and only choose the one that is the best, not just the first one you read that is factually correct.

Strategy 12: First Word Analysis

When asked for main ideas that best summarize the passage, an easy strategy is to look at the first words in each answer choice and without looking at the rest of the answer choice, see if you could make a decision based on those first words alone.

Example:
Question: Which of the following best explains the author's primary purpose?

A. dispute…
B. describe…
C. condemn…
D. convince…

If you know that the passage is fairly neutral about the subject, then even if you know nothing else, you can probably eliminate the stronger verbs used in answer choices A, C, and D, leaving you with "describe" or answer choice B as being correct.

Strategy 13: Understanding the Intimidation

The test writers will generally choose passages that will be completely foreign to most test takers. You can't expect the passages to be on a topic with which you have any familiarity. If you do happen to come

across a passage that you are familiar with, consider yourself lucky, but don't plan on that happening.

The passages will also frequently be drawn from longer passages in books, articles, journals, etc. Therefore, the passage that you will face on the test may almost seem out of context and as though it begins in the middle of a thought process. You won't have a nice title overhead explaining the general topic being covered but will immediately be thrown into the middle of a strange format that you don't recognize.

Also, while the topics chosen may have originally been interesting reading in their original state, after a particular section is pulled and used for the test passage, it will likely be dry and boring.

Getting hit by strange reading topics that you don't recognize, of which you may only have a small part of the original selection, and that are dry and boring can be a bit intimidating if you're not adequately prepared. Just remember that the passages themselves will contain all the information necessary to answer the questions and you don't need any prior knowledge of the topic in order to succeed and do well on the test.

Strategy 14: Finding your Optimal Pace

Everyone reads at a different rate. It will take practice to determine what is the optimal rate at which you can read fast and yet absorb and comprehend the information. This is true for both the flyover that you should initially conduct and then the subsequent reading you will have to do as you go through and begin answering the questions. However,

on the flyover, you are looking for only a surface level knowledge and are not trying to comprehend the minutia of details that will be contained in the passages.

You can practice with any form of reading material. Read an article at your normal pace and then after you're finished, ask yourself some questions about what you just read and see how well you can comprehend. Experiment with reading articles faster and slower and always gauge how well you comprehended what you read at the end. Train your brain to remember the details and absorb the facts.

With practice, you will find the pace that you should maintain on the test while going back through passages. It should be a comfortable rate. This is not a speed reading exercise. If you have a good pace, and don't spend too much time on any question, you should have a sufficient amount of time to read the different sections of the passages at a comfortable rate. The two extremes you want to avoid are the dumbfounded mode, in which you are lip reading every word individually and mouthing each word as though in a stupor, and the overwhelmed mode, where you are panicked and are buzzing back and forth through the passage in a frenzy and not comprehending anything.

You must find your own pace that is relaxed and focused, allowing you to have time for every question and give you optimal comprehension. Note that you are looking for optimal comprehension, not maximum comprehension. If you spent hours on each word and memorized the passage, you would have maximum comprehension. That isn't the goal though, you want to optimize how much you comprehend with

how much time you spend reading. Practice will allow you to determine that optimal rate.

Strategy 15: Don't be a Perfectionist

If you're a perfectionist, this may be one of the hardest strategies, and yet one of the most important. The test you are taking is timed, and you cannot afford to spend too much time on any one question.

If you are working on a problem and you've got your answer split between two possible answer choices, and you're going back through the passage and reading it over and over again in order to decide between the two, you can be in one of the most frustrating situations possible. You feel that if you just spent one more minute on the problem, that you would be able to figure the right answer out and decide between the two. Watch out! You can easily get so absorbed in that problem that you loose track of time, get off track and end up spending the rest of the test playing catch up because of all the wasted time, which may leave you rattled and cause you to miss even more questions that you would have otherwise.

Therefore, unless you will only be satisfied with a perfect score and your abilities are in the top .1% strata of test takers, you should not go into the test with the mindset that you've got to get every question right. It is far better to accept that you will have to guess on some questions and possibly get them wrong and still have time for every question, than to work on every problem until you're absolutely confident in your answer and then run out of time on the last few problems.

Strategy 16: Factually Correct, but Actually Wrong

A favorite ploy of question writers is to write answer choices that are factually correct on their own, but fail to answer the question, and so are actually wrong.

When you are going through the answer choices and one jumps out for being factually correct, watch out. Before you mark it as your answer choice, first make sure that you go back to the question and confirm that the answer choice answers the question being asked.

Strategy 17: Different Viewpoints

Some passages will express the author's viewpoint on a topic, along with the viewpoint of other experts or other individuals. This can lead to trouble in answering questions though. If asked for the viewpoint of the author, you might go back to the passage, find where a certain viewpoint is expressed, answer the question based on what you read and move on.

For most passages, that would be fine, but when other viewpoints besides the author's are expressed, you have to discern who is expressing their opinion in the passage. Make sure that if multiple individuals are giving their viewpoint on a topic, that you sort them out for any questions and associate the right viewpoint with the right individual.

Strategy 18: Extraneous Information

Some answer choices will seem to fit in and answer the question being asked. They might even be factually correct. Everything seems to check out, so what could possibly be wrong?

Does the answer choice actually match the passage, or is it based on extraneous information not even contained in the passage. Just because an answer choice seems right, don't assume that you overlooked information while reading the passage. Always try to go back and find the support for the answer choice in the passage. Your mind can easily play tricks on you and make you think that you read something or that you overlooked a phrase.

Unless you are behind on time, always go back to the passage and make sure that the answer choice "checks out."

Mathematics

The Mathematics test measures a test taker's ability to solve problems representing some of the key concepts in mathematics. Some problems will only test one concept, while others will involve multiple concepts integrated together in a single problem.

The problems will have few technical terms, aside from basics, such as area, perimeter, integer, and ratio, which are expected to be common mathematical knowledge. All figures shown will be drawn accurately and lie in a single plane, unless noted otherwise.

Number Types

Integers, Odd and Even Numbers, Prime Numbers, Digits

- **Integers**..., -4, -3, -2, -1, 0, 1, 2, 3, 4, ...
- **Consecutive Integers**: Integers that follow in sequence; for example, 22, 23, 24, 25. Consecutive Integers can be more generally represented by n, n + 1, n + 2, n + 3, ...
- **Odd Numbers**..., -9, -7, -5, -3, -1, 1, 3, 5, 7, 9, ...
- **Even Numbers**..., -8, -6, -4, -2, 0, 2, 4, 6, 8, ... (Note: zero is an even number)
- **Prime Numbers**..., 2, 3, 4, 7, 11, 13, 17, 19, ... (Note 1 is not a prime and 2 is the only even prime)
- **Digits:** 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Addition and Multiplication of Odd and Even Numbers

Addition	Multiplication
even + even = even	even x even = even
odd + odd = even	even x odd = even
even + odd = odd	odd x odd = odd

Percent

Percent means hundredths or number out of 100. For example, 40 percent means 40/100 or .40 or 2/5.

Percent less than 100

Problem 1: If the sales tax on a $30 item is $1.80, what is the sales tax rate?

Solution: $1.80 = n/100 x $30

n = 6, so 6% is the sale tax rate

Percent Greater than 100

Problem 2: What number is 250% of 2?

Solution: n = 250/100 x 2

n = 5, so 5 is the number

Percent less than 1

Problem 3: 3 is 0.2 percent of what number?

Solution: 3 = 0.2/100 x n

n = 1,500, so 1,500 is the number

Percent Increase/Decrease

Problem 4: If the price of a computer was decreased from $1,000 to $750, by what percent was the price decreased?

Solution: The price decrease is $250. The percent decrease is the value of n in the equation 250/1000 = n/100. The value of n is 25, so the price was decreased by 25%.

Notes: n% increase means increase/original = n/100;
n% decrease means decrease/original = n/100.

Average

An average is a statistic that is used to summarize data. The most common type of average is the *arithmetic mean.* The average (arithmetic mean) of a list of n numbers is equal to the sum of the numbers divided by n. For example, the mean of 2, 3, 5, 7, and 13 is equal to

2 + 3 + 5 + 7 + 13 / 5 = 6

When the average of a list of n numbers is given, the sum of the numbers can be found. For example if the average of six numbers is 12, the sum of these six numbers is 12 x 6, or 72.

The *median* of a list of numbers is the number in the middle when the numbers are ordered from greatest to least or from least to greatest. For example, the median of 3, 8, 2, 6, and 9 is 6 because when the numbers are ordered, 2, 3, 6, 8, 9, the number in the middle is 6. When there is an even number of values, the median is the same as the mean of the two middle numbers. For example, the median of 6, 8, 9, 13, 14, and 16 is

$$9 + 13 / 2 = 11$$

The *mode* of a list of numbers is the number that occurs most often in the list. For example, 7 is the mode of 2, 7, 5, 8, 7, and 12. The numbers 10, 12, 14, 16, and 18 have no mode and the numbers 2, 4, 2, 8, 2, 4, 7, 4, 9, and 11 have two modes, 2 and 4.

Note: The mean, median, and mode can each be considered an average. On the test, the use of the word average refers the arithmetic mean and is indicated by "average (arithmetic mean)." The exception is when a question involves average speed (see problem 2 below). Questions involving the median and mode will have those terms stated as part of the question's text.

Weighted Average

Problem 1: In a group of 10 students, 7 are 13 years old and 3 are 17 years old. What is the average (arithmetic mean) age of these 10 students?

Solution: The solution is not the average of 13 and 17, which is 15. In this case the average is

$$7(13) + 3(17) / 10 = 91 + 51 / 10 = 14.2 \text{ years}$$

The expression “weighted average” comes from the fact that 13 gets a weight factor of 7, whereas 17 gets a weight factor of 3.

Average Speed

Problem 2: Jane traveled for 2 hours at a rate of 70 kilometers per hour and for 5 hours at a rate of 60 kilometers per hour. What was her average speed for the 7-hour time period?

Solution: In this situation, the average speed is:

Total Distance/Total Time

The total distance is 2(70) + 5(60) = 440 km.
The total time is 7 hours. Thus the average speed was

440/7 = 62 6/7 kilometers per hour.

Note: In this example the average speed is not the average of the two separate speeds, which would be 65.

Properties of Signed Numbers

positive x negative = negative

negative x negative = positive

negative x positive = negative

positive x positive = positive

Factoring

You may need to apply these types of simple factoring:

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

$x^2 – 1 = (x + 1)(x – 1)$

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

$x^2 – 3x – 4 = (x – 4)(x + 1)$

Probability

Probability refers to the chance that a specific outcome can occur. It can be found by using the following definition when outcomes are equally likely.

$$\frac{\text{Number of ways that a specific outcome can occur}}{\text{Total number of possible outcomes}}$$

For example, if a jar contains 13 red marbles and 7 green marbles, the probability that a marble selected from the jar at random will be green is

$$7 / 7 + 13 = 7/20 = \text{or } 0.35$$

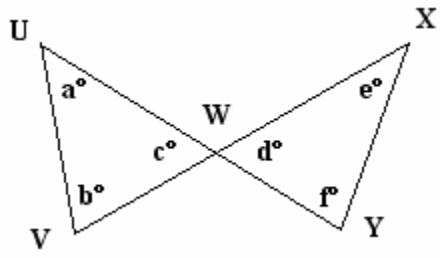
If a particular outcome can never occur, its probability is 0. If an outcome is certain to occur, its probability is 1. In general, if p is the

probability that a specific outcome will occur, values of p fall in the range $0 \leq p \leq 1$. Probability may be expressed as either a decimal or a fraction.

Geometric Figures

Figures that accompany problems are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a particular problem that the figure is not drawn to scale. In general, even when figure is not drawn to scale, the relative positions of points and angles may be assumed to be in the order shown. Also, line segments that extend through points and appear to lie on the same line may be assumed to be on the same line. The text "Note: Figure not drawn to scale." is included on the test when degree measures may not be accurately shown and specific lengths may not be drawn proportionally. The following examples illustrate the way different figures can be interpreted.

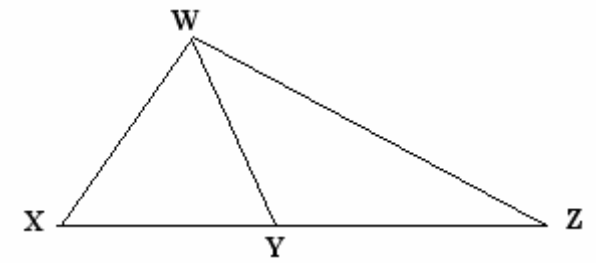
Example 1



Since UY and VX are line segments, angels UWV and XWY are vertical angles. Therefore, you can conclude that c° = d°. Even though the figure is drawn to scale, you should NOT make any other assumptions without additional information. For example, you should NOT assume

that VW = WY or that the angle at vertex Y is a right angle even though they may look that way in the figure.

Example 2



A question may refer to a triangle such as XWZ above. Although the note indicates that the figure is not drawn to scale, you may assume that:

(1) XWY and YWZ are triangles.
(2) Y is between X and Z.
(3) X, Y, and Z are points on a line.
(4) The length of XY is less than the length of XZ.
(5) The measure of angle XWY is less than the measure of angle XWZ.

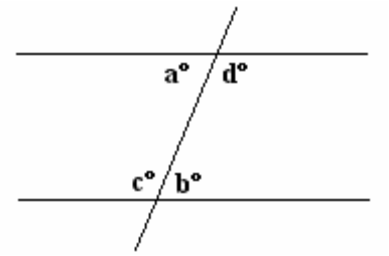
You may *not* assume the following:

(1) The length of XY is less than the length of YZ.
(2) The measures of angles WXY and WYX are equal.
(3) The measure of angle XWY is greater than the measure of angle WYX.
(4) Angle XWZ is a right angle.

Geometric Skills and Concepts

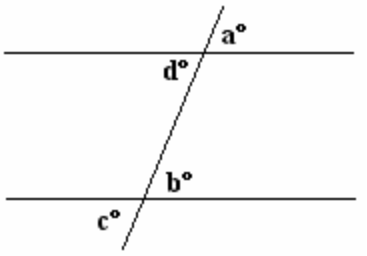
Properties of Parallel Lines

1. If two parallel lines are cut by a third line, the alternate interior angles are equal.



a° = b° and d° = c°

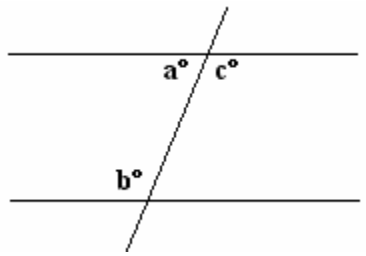
2. If two parallel lines are cut by a third line, the corresponding angles are equal.



a° = b° and d° = c°

Note: Words like “alternate interior” or “corresponding” are generally not used on the test, but you do need to know which angles involving parallel lines are equal.

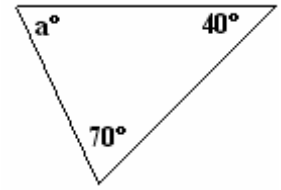
3. If two parallel lines are cut by a third line, the sum of the interior angles on the same side of the third line is 180 degrees.



a° + b° = 180°, because a° + c° = 180° and b° = c°

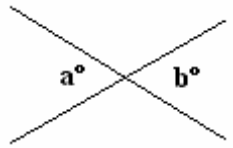
Angle Relationships

1. The sum of the interior angles of a triangle is 180 degrees.



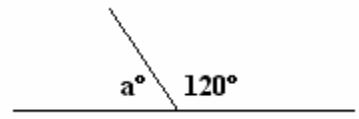
a° = 70° (Because 70° + 40° + a° = 180°.)

2. When two lines intersect, vertical angles are equal.



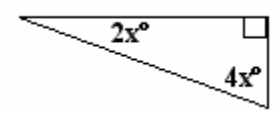
a = b

3. A straight angle measures 180 degrees.



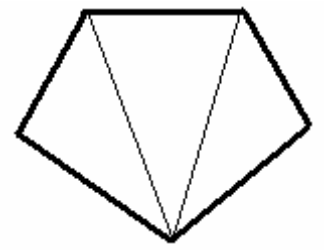
a° = 60 (Because a° + 120° = 180°.)

4. The sum of the two acute angles in a right triangle is 90 degrees.



x = 15 (Because 2x + 4x = 90.)

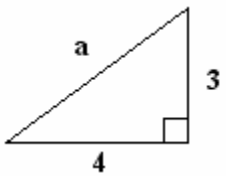
5. The sum of the interior angles of a polygon can be found by drawing all diagonals of the polygon from one vertex and multiplying the number of triangles formed by 180 degrees.



Since the polygon is divided into 3 triangles, the sum of the angles is 3 x 180° or 540°.

Side Relationships

1. Pythagorean Theorem: In any right triangle, $a^2 + b^2 = c^2$, where c is the length of the longest side and a and b are the lengths of the two shorter sides.



a = 5

(By the Pythagorean Theorem,

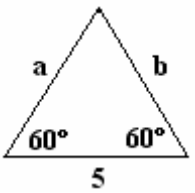
$a^2 = 3^2 + 4^2$

$a^2 = 9 = 16$

$a^2 = 25$

a = square root of 25 = 5

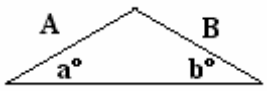
2. In any equilateral triangle, all sides are equal and all angles are equal.



a = b = 5

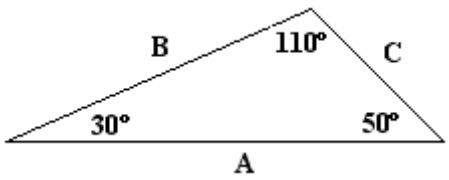
(Because the measure of the unmarked angle is 60°, the measure of all angles of the triangle are equal, and therefore, the lengths of all sides of the triangle are equal.)

3. In an isosceles triangle, the angles opposite equal sides are equal. Also the sides opposite equal angles are equal.



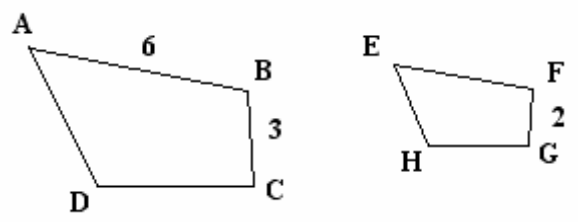
If A = B, then a° = b°. Also, if a° = b°, then A = B.

4. In any triangle, the longest side is opposite the largest angle (and the shortest side is opposite the smallest angle.)



A>B>C

5. Two polygons are *similar* if the lengths of their corresponding sides are in the same ratio and their corresponding angles are equal.



If polygons ABCD and EFGH are similar, and if BC and FG are corresponding sides, then BC = 3 and FG = 2.

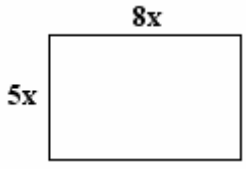
Therefore, the ratio is 3:2 and since AB = 6, EF = 4

Area and Perimeter

Rectangles

Area of a rectangle = length x width = l x w

Perimeter of a rectangle = 2(l + w) = 2l x 2w



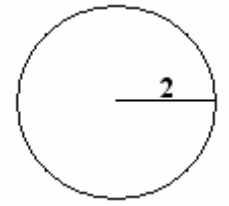
Area = 5x X 8x = $40x^2$

Perimeter = 2(5x + 8x) = 10x + 16x = 26x

Circles

Area of a circle = Πr^2 (where r is the radius)

Circumference of a circle = $2\Pi r = \Pi d$ (where d is the diameter)



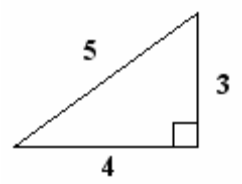
Area = $\Pi 2^2 = 4\Pi$

Circumference = $2\Pi 2 = 4\Pi$

Triangles

Area of a triangle = ½ (base X height)

Perimenter = Sum of lengths

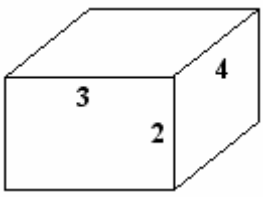


Area = ½ (4 X 3) = 6

Perimeter = 5 + 4 + 3 = 12

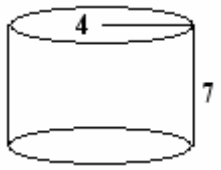
Volume

Volume of a rectangular solid or cube = length X width X height = l X w X h



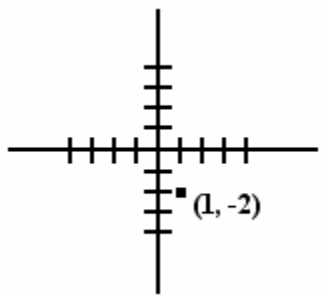
Volume = 3 X 2 X 4 = 24

Volume of a cylinder = $\Pi r^2 h$ (where r is the radius of the base and h is the height of the cylinder)



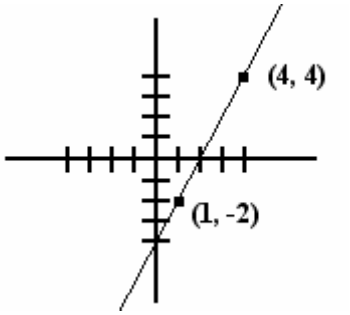
Volume = Π X 4^2 X 7 = Π X 16 X 7 = 112Π

Coordinate Geometry



In questions that involve the x and y axes, x values to the right of the y axis are positive and x values to the left of the y axis are negative. Also, y values above the x axis are positive and y values below the x axis are negative. In an (x,y) ordered pair, the x value is written first, and the y value is written second. For example, in the ordered pair (1,-2), the x coordinate is 1 and the y coordinate is -2.

Slope of a line = rise/run or vertical distance/horizontal distance.



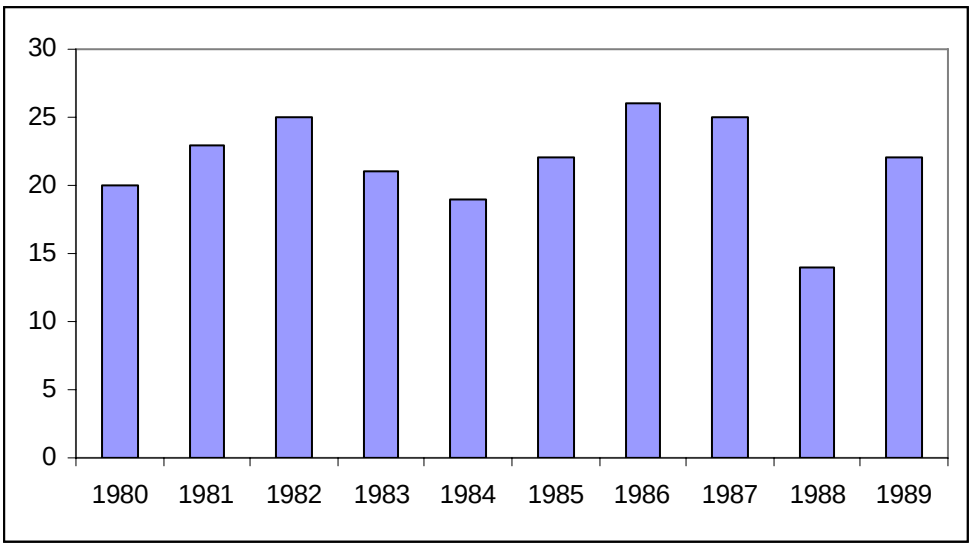
This line runs through points (1,-2) and (4,4). The slope = (4 – (-2))/(4 – 1) or 6/3 = 2.

Any line that slopes upward from left to right has a positive slope. Any line that slopes downward from right to left has a negative slope.

Science

Strategy 1: Understanding Charts and Tables

Much of the difficulty that most test takers have with this section of the test is the charts, tables and graphs that are referenced in its questions. Properly understanding how to read each of these is critical to succeeding on the test.



Question 1: Ask yourself what is being shown in the data presented? In this chart a decade's worth of data is displayed, showing varying amounts of some quantity each year.

Question 2: Ask yourself if any trends can be detected? As you review the chart, you can see that it appears that there is a 4 year cycle in occurrence. Every 4 years, the data increases, then decreases again, with cycle highs and lows each separated by 4 year intervals.

Question 3: Ask yourself if there is anything remarkable about any of the data points? It appears that there was an extremely low point in 1988. Odds are one of the questions will ask about this data point and any other unusual features of the chart.

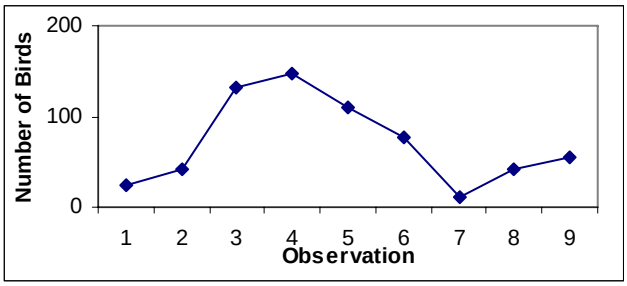
Mixture	Average mass
A	2g
B	4g
C	1g
D	6g
E	2g
F	3g

You can ask yourself the same questions concerning a table. What's being shown? What are the trends? What is unusual?

If you know what to expect and are familiar with using them, charts and graphs are actually quite simple and easy to use. They contain information contained horizontally along the x-axis, and other information contained vertically along the y-axis. When you find the point along the x-axis and y-axis that you are looking for and then identify their intersection, you will find the information that you need to solve the question.

Strategy 2: When Vagueness is Clear

When a graph doesn't have exact measurements that are easily identifiable, odds are you will not need to differentiate between two close data points.



Example: Bird watchers are interested in seeing rare birds. According to the figure above, during which observation period, would one be LEAST likely to see a rare bird.

A. period 2
B. period 4
C. period 7
D. period 8

In this graph, the y-axis only lists three data points (0, 100, and 200). This makes it difficult to determine whether close observations actually differ. For example, period 2 and period 8 appear to have approximately the same number of birds and it is difficult to determine if either has more or less. Therefore, you will typically NOT be asked to make such a differentiation. So, as you go through the answer choices, you don't have to worry about choosing between choice A and D, since choice C clearly had the fewest number of birds, making it the least likely opportunity for an observer to see a rare bird.

Strategy 3: Avoiding Definites

Answer choices that make definite statements with no "wiggle room" are often wrong. Try to choose answer choices that make less definite

and more general statements that would likely be correct in a wider range of situations and aren't exclusive.

Example:

A. Some of the highest values occurred during periods of low activity.
B. The highest values occurred at an activity level of 5 throughout the observed period.
C. The lowest values occurred at an activity level of 2 throughout the observed period.
D. The activity level remained at the same throughout the observed period.

Without knowing anything about the question, answer choice A uses the term "some," which has wiggle room, meaning there could have been a few data points that had high values that didn't occur during periods of low activity. All of the other answer choices have a more definite sense about them, implying a more precise answer choice without wiggle room that is often wrong.

Strategy 4: Using Common Sense

The questions on the test are not intended to be trick questions. Therefore, most of the answer choices will have a sense of normalcy about them that may be fairly obvious and could be answered simply by using common sense.

While many of the topics will be ones that you are completely unfamiliar with, there will likely be a couple of topics that you have

some prior indirect knowledge about that will help you solve the problems.

Example:
Which of the following conclusions about the length of day is consistent with the information provided?

A. the longer the day, the more photosynthesis takes place
B. the length of day has no affect on photosynthesis
C. the length of day was the most important variable tested
D. further trials need to be conducted to determine the true effect of the length of day

You probably have a vague understanding of day length and photosynthesis and can probably put together this commonsense equation:

Length of day = more sunlight = more photosynthesis

Choice A passes the test with this equation and is correct.

Strategy 5: Instincts are Right

When in doubt, go with your first instinct. This is an old test-taking trick that still works today. Oftentimes if something feels right instinctively, it is right. Unfortunately, over analytical test takers will often convince themselves otherwise. Don't fall for that trap and try not to get too nitpicky about an answer choice. You shouldn't have to twist the facts and create hypothetical scenarios for an answer choice to be correct.

Example: If scientist 1 is correct, the larger the ant colony, the:

A. less frequently foraging will occur
B. more frequently foraging will occur
C. larger the size of the foraging area
D. smaller the size of the foraging area

Your first instinct is that the size of the ant colony would affect the size of the foraging area allowing you to choose choice C.

Strategy 6: No Fear

The science test can be a bit intimidating to a lot of people as it can deal with topics that have never been encountered before and are highly technical. Don't get bogged down by the data presented. Don't try to understand every facet of the experiment. You won't have to write an essay about the topics afterwards, so don't memorize the facts. These topics are technical and are likely to be in an area that you have no background. Don't get overwhelmed.

Strategy 7: Looking for the Changes

Anything odd is likely to be asked about. Any differences that occur between experiments or scientists are guaranteed to have questions to make sure you understand those differences. Make sure that as you review the information, you are on the lookout for changes.

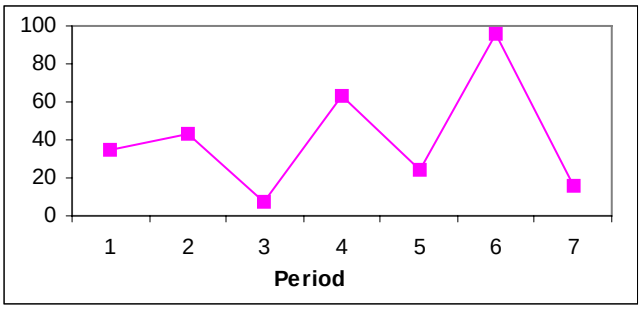
If one of the experiments deals with the duration of lifetimes for various materials – make sure you take note of the ones that were extremely short or extremely long. Circle them in your answer booklet, and be ready to go back and identify them in later questions.

Strategy 8: Quick Checks

Many of the questions will require you to examine each answer choice, return to the graph or chart and see where it falls and then compare it to the other answer choices.

Remembering that questions will typically focus on the differences, the extremes, the outliers in a series of data, this can help you quickly hone in on the correct answer.

Example: Which period would be MOST likely to have….?



Rather than looking at each answer choice and then comparing them to see which was best, odds are the correct answer choice will not just be the period in the graph that is highest among the provided answer choices, it will likely be the period that has the highest of any period.

A. period 2
B. period 4
C. period 6
D. period 7

Without looking at the answer choices, the period that is MOST likely to contain anything is probably going to be period 6, because it is the highest peak on the graph. Now look and see if period 6 is among the answer choices. It is, making answer choice C correct.

For questions that ask about the MOST or LEAST, the highest peak or lowest valley on the graph will probably be the correct answer choice, meaning you can look first at the graph, and then at the answer choices, saving you time.

The question above could have the following answer choices:

A. period 2
B. period 4
C. period 5
D. period 7

This would make answer choice B correct, as period 4 is greater than the others listed. Since period 6 isn't a viable choice, you would be forced to choose period 4. However, rarely will you be faced with a

question like this in which the period or point on a graph that is the absolute MOST or LEAST is not listed as a possible answer choice.

Strategy 9: Looking for Matches

Questions that have long answers will often give away the right answer choice. Test writers will try to trick up the test taker, but a smart test taker can often use those tricks in their favor to point to the correct answer choice.

Example:

Which of the following combinations of characteristics would create the optimal living conditions?

A. 50 ft of depth at 30°
B. 100 ft of depth at 20°
C. 100 ft of depth at 40°
D. 150 ft of depth at 20°

Without knowing anything about the living conditions or experiments, you can see that 20° is listed twice, making it the most popular, and 100 ft is listed twice, making it the most popular. Therefore, look for an answer choice that combines the most popular of each characteristic, which makes answer choice B correct.

Strategy 10: Information is Provided for a Reason

When a question offers new information to consider, remember that it is given for a reason. Look for the correct answer choice to include the new information in what form or another.

Example: Burrowing animals create spots of bare earth in the meadow. On the basis of the experimental results, one would predict that over several years the wildflowers would:

A. not grow or reproduce in the meadow
B. not grow in the meadow but their seeds would be found in the meadow
C. grow in the meadow and reproduce in the cleared areas created by animals
D. grow in the meadow and reproduce only in the areas containing woody plants

Only choice C contains a phrase that actually links to the question "cleared areas created by animals."

Strategy 11: Watching for Similar Rewording

In order to increase the difficulty of otherwise simple questions, test writers will often reword the correct answer using similar wording that is somewhat different but still means the same thing. Don't get distracted in trying to find the perfect match, as a similarly worded answer choice may likely be the correct answer choice.

Example: Which of the following factors was controlled by the scientist?

A. plant mass
B. soil moisture
C. presence of rabbits
D. presence of neighboring plants

Choice D “presence of neighboring plants” means the same as clearing the ground of vegetation, which is what was described in the experiment and was the exact wording of the answer choice you were expecting.

Strategy 12: Don’t Get Thrown Off by New Information

Sometimes test writers will include completely new information in answer choices that are wrong. Test takers will get thrown off by the new information and if it seems like it might be related, they could choose that answer choice incorrectly. Make sure that you don’t get distracted by answer choices containing new information that doesn’t answer the question.

Example: Which conclusion is best supported?

A. unable to reproduce due to the absence of bee pollination

Was bee pollination even discussed? NO – then don’t consider this answer choice, it is wrong.

Strategy 13: Narrowing the Search

Whenever two answer choices are direct opposites, the correct answer choice is usually one of the two. It is hard for test writers to resist making one of the wrong answer choices with the same wording, but changing one word to make it the direct opposite in meaning. This can usually cue a test taker in that one of the two choices is correct.

Example:

A. There would be more holes visible in images taken on days when thunderstorms are present
B. There would be fewer holes visible in images taken on days when thunderstorms are present.

These answer choices are direct opposites, meaning one of them is likely correct. You can typically rule out the other two answer choices.

Strategy 14: What About the Opposite

Some difficult answer choices may be hard to understand and properly analyze. A technique that can often make them easier to interpret is to consider would they be correct, incorrect, or not matter if they were the direct opposite.

Example: Which of the following observations would support scientist 1's view?

A. Ground based telescopes observe comets entering the atmosphere
B. The receiving station cannot collect data during a thunderstorm
C. Atmospheric holes appear in the same location in all images
D. A number of very dark pixels are seen in the images

As you read each answer choice, change it around in your mind to represent the opposite view. This may help clarify whether it is right or wrong.

Example:

A. Ground based telescopes do NOT observe comets entering the atmosphere

B. The receiving station CAN collect data during a thunderstorm
C. Atmospheric holes appear in DIFFERENT locations in all images
D. A number of very LIGHT pixels are seen in the images

By mentally reversing each of the answer choices, sometimes it will make it easier to determine which ones are correct and incorrect.

Strategy 15: You're not Expected to be Einstein

The questions should contain all of the information that you need to know in order to answer them. You aren't expected to be Einstein or to know all related knowledge to the topic being discussed. Remember, these questions may be about obscure topics that you've never heard of. If you would need to know a lot of outside knowledge about a topic in order to choose a certain answer choice – it's usually wrong.

Example: Which of the following explanations would also account for the presence of holes in the images?

A. Unexpected solar eclipses
B. Lightning storms on Venus
C. Flaws that occurred while converting the electronic data to visible images
D. A uniform thinning of Earth's atmosphere

If the question doesn't discuss solar eclipses or lightning storms on Venus, you aren't expected to know what their effect would be. You can typically rule out these answer choices that would require a specialist's knowledge of the topic.

Strategy 16: Identifying the Key Component

As you look for the right answer choice, bear in your mind what the key component that the answer choice will have to have.
Example: Which of the following procedures would be most helpful in establishing the rain-producing abilities of the five compounds?

A. Repeating Experiments 1 and 2 with five new compounds
B. Repeating Experiment 2 but performing 100 trials
C. Repeating Experiment 3 but seeding at 6,000 ft
D. Repeating Experiments 2 and 3 on each compound

After reading the question, but before going through the answer choices. You know that since you are interested in establishing the abilities of the five compounds used in the experiments, the answer choice is going to have to affect all five compounds. That is the key component.

Now go through the answer choices armed with that key component.

A. discusses five NEW compounds – ruling it out
B. repeating Experiment 2 with 100 trials – going back to Experiment 2, you see that it only involved one of the five compounds, ruling it out
C. repeating Experiment 3 by seeding at 6,000 ft – going back to Experiment 3, you see that it only involved one of the five compounds, ruling it out
D. Repeating Experiments 2 and 3 on each compound – note the key component "each compound," clearly referring to all five of the original compounds, making answer choice D correct.

Strategy 17: Fulfilling all the Requirements

Example: How many of the trial sets in the three experiments would the scientist call *successful*?

Your first impulse might be to look at the trial set in experiment 1 and see how many of the trials met the criteria for success. But remember that the question asked about all three experiments, so you have to count the ones that are successful in experiments 2 and 3 as well as experiment 1. Just before you make your final answer choice selection, glance back over the question and confirm that you have satisfied all the question requirements.

Strategy 18: When It Doesn't Make Sense – Check It Systematically

Sometimes the answer that you're looking for isn't listed in the answer choices. When this happens, you need to go back over the question in a systematic fashion and determine where you made a mistake.

Example: The question asks about bromthymol blue and you find information from a table about bromphenol blue instead.

When you look for the answer choice that you expect, it isn't there. Don't panic and just put the closest answer to what you expect. Take a moment to go back through and check everything in the question and you'll catch the simple mistake that you made in confusing bromphenol blue for bromthymol blue on a table that contained them

both. When your only choice is an answer choice that isn't what you expected, but might be "good enough," go back through and see if you made a simple mistake in understanding the question. This is particularly true when you have an answer choice of numbers that you found on a table or graph. Number answers should be exact, not just "good enough."