Grades Booster
Study Tips and Test Skills

This packet contains simple study strategies to help you master the fine arts of math, science, language, and many more subjects.

Armstrong Atlantic State University Counseling Center
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Section 1: Learning to Study
How to Study
By: Ronald C. Blue

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Countless times students have asked me what is the best way to study. While the recommendations that I am about to make to you are no guarantee of success, I believe they will optimize your chances of success.

Perspectives on the problem:

Research shows that the average student will study for a test. The average person will study four hours for a daily quiz, four hours for a weekly quiz, four hours for a major test, four hours for a midterm, and four hours for a comprehensive final. The outcome of this four hours of study will vary from an A for a daily quiz to an F for the comprehensive final. This means that in high school grades are strongly determined by intelligence since everyone studies the same amount of time.

College is different. Most of the students are highly intelligent and some are highly motivated.

In almost all college courses if you have a poor vocabulary and do not really like to read, you are in serious trouble. If you can succeed with your weird teachers, then you can succeed with your even weirder bosses. Your study habits formed in high school may vector you toward failure because you have never experienced what it takes to perform at the college level. That is why the freshman year is the hardest year you will ever experience in college.

It takes about one year to learn how to learn at a college level. Most people never learned to learn at a college level. They then encourage their children to get the education they never got. They rarely read and talk about intellectual ideas, thereby predisposing their children for low academic achievement.

You should break the pattern. There is no gain in life without some pain.

Based on my extensive observation of student performances on college tests, I recommend the following study time per test: (For Tests every 3 to 4 weeks)

<table>
<thead>
<tr>
<th>TOTAL HOURS</th>
<th>HOURS PER WEEK</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 hours for an A</td>
<td>6 hours per week</td>
</tr>
<tr>
<td>16 hours for a B</td>
<td>4 hours per week</td>
</tr>
<tr>
<td>14 hours for a C</td>
<td>3.5 hours per week</td>
</tr>
<tr>
<td>10 hours for a D</td>
<td>2.5 hours per week</td>
</tr>
<tr>
<td>0 hours for an F</td>
<td>0 hours per week</td>
</tr>
</tbody>
</table>

An hour of study is defined as studying for 45 minutes and a break of 15 minutes. Ten hours of continuous study without a break is defined as one hour of study.
The brain does not process and store information the way students prefer studying. Occasionally, some succeed by studying at the last minute, but they are exceptions to the rule. Some people's brain and life experiences reduce the time required to learn particular types of material. In other types of material they have to spend more time to master the material.

Research suggests that the slowest 10 percent of students may need 5 to 6 times as much time to learn the same material as the fastest 10 percent. Each person is highly likely to have strengths and weaknesses. Overcoming your weakness increases your strength.

In other words, you can succeed if you pay the price necessary for success.

**The price of success:**

The price is too high you say. Or I would like to succeed but don’t have the time. It isn't fair you say.

Life is not fair. Reality is not your parents. There is no free lunch. Anything of value requires great effort. If you pay the price, the price required of you in the future will be less. In the past a college degree has meant about $100,000 to $250,000 more in a lifetime than no degree. Each college test is worth about $36 per hour of study or $800 over your life.

If you were offered $1,000,000 if you had an A in a college course, could you accomplish the goal? Probably. You do not have to be a genius to graduate from college. You have to work hard, be persistent, and pay attention to details. These traits are ultimately why a college degree is valuable, plus the capacity to learn.

**How to get started:**

Believe you can succeed. Be willing to pay the price. The price is always what you don’t want to pay. Make success in college your number one goal. You cannot have multiple goals. Everything comes in its own season. There is a time to learn, a time to play, and a time to work.

Failure begins in an excuse, a short cut. There is no royal road to learning or achieving excellence.

Do the following without wavering.

- **Survey:**

  Before you start your learning task, read over the major headlines and summaries of the chapters in the textbook. This gives you a feeling for the whole picture and to what material you should pay attention while reading the chapters. Research shows that students who do this make higher grades, and this simple step is the most powerful thing you can do.
• **Reading, underlining, and taking notes:**

As you read the material, you must take written notes and underline. Use only the left half of the page. Transfer to the right side of the paper comments your teacher made about the material during the lecture. You must always be ahead of your teacher in your reading. Research shows that the more different ways you present the information to the brain the easier it is to learn. In other words, hear it, see it, say it, write it, practice it, highlight it, quiz it, etc. Underlining is a skill that must be developed. The tools of underlining should vary based on your preference. Use highlighters or colored pens. I recommend red and blue Flair pens. If you use these, you need a plastic ruler for underlining. Use a drafting plastic triangle and have it cut off at the three ends about one inch each.

Now spray paint the underlining ruler with flat black paint. This reduces or eliminates glare from light when reading and underlining. At first you should underline approximately 85 percent of the material. Later on as your skill increases, you should reduce the material underlined. Use red and blue Flair pens for underlining important information as you read. Use red for extremely important material or to offset important material, and blue for moderately important material. You should use a pink and yellow highlighter when reading the material the second time. The process of reading and deciding if the material is important enough to be underlined increases memory for that material. It is the decision and thinking that creates the memory.

It is best to over predict your instructors at first. It is easier to cut back on the material to be learned than to increase the amount to be learned. Use stars to arrange the material in hierarchies of importance. Three stars (***) would be more important than two stars (**)..

• **The 3” x 5” card system:**

Using the colors of red and blue, now make 3” x 5” cards, putting the vocabulary of the course, long lists of items, experiments, and lecture on the cards. Key words should be written in red. If you have to be different, go with 1” x 3” instead of 4” x 6”. One theory, concept, or vocabulary word per card. The biggest problem with textbooks and lecture notes is that we cannot separate the material that we know from the material that we do not know. Because of this, we waste hours studying what we already know, rather than concentrating our valuable time on what we do not know. The red tells your mind that this is extremely important material. Writing the material stores the information in the brain in a way that is not normally used. On the back of the cards is definition about material on the front. After numbering the cards so you can put them back in order later on, you should start studying the cards until you feel you know the material. Now then turn the cards over and try and answer your fill in the blanks orally. If you get the questions right, place the material into a “I know this material” stack. Now continue working on the material that you don’t know until you can answer the questions on all the cards.
• **Review:**

Now reread the material that you underlined in the book. Note that you do not read the material you did not underline. This is why over prediction is important. As you read the chapter, bracket and star the material you believe is extremely important. Sometimes use a yellow highlighter for critical information. Now reread the material you have bracketed or stored and high speed review the material on the 3” x5” cards.

• **Audio option:**

The more different ways that the material to be learned can be experienced the easier it is to remember the material. If you have time, read the material that you have underlined to a tape recorder. Then play back and listen to the material. Some people are so good at learning by listening that this is the only way they have to study.

• **Over-learning:**

The more you over-learn the material the easier it is to take a test with confidence and in a relaxed manner. In addition, the more you over-learn something, the longer you will remember it.

• **Special problems:**

Some people have reading difficulties. Current research suggests that blue or gray sunglasses may help dyslexic people process and learn to read. *(Another possibility is laying a piece of green, blue, or red transparency film over the page to be read. Try them and see which works best. These may be purchased at office supply stores. –S. Shapiro)*

Self typing of the material is another way shown to have positive benefits for dyslexics. The key concept is that learning requires work. Good nutrition helps learning. Research suggests that zinc and B vitamins are essential for learning.
Concentration
*Source material unknown.*

**THE PROBLEM**

In many colleges over 8% of the students report problems concentrating on their studies. Most of these students blame outside distractions for their problems.

Many research studies manipulating noise levels and distractions have found that such disturbances may increase, decrease, or even not affect concentration. These researchers have therefore concluded that distracters don’t cause concentration problems directly. It is the way the distracters are interpreted by the students that disrupts their study.

**CREATING A STUDY ENVIRONMENT**

1. Find a place for study and keep it for study only.
2. Tool-up the environment with all study needs.
3. Control noise level and the visual environment to acceptable levels.
4. Avoid relaxing while working; create a work atmosphere.

**WHEN TO STUDY**

1. Best during the day and early evening; you’ll remember better.
2. Best when there are fewest competing activities in progress.
3. Best when adequate rest periods are provided.
4. Stop studying when fatigue or lack of attention occurs.

**HOW TO STUDY & CONCENTRATE**

1. When distracters are present, become intensely involved.
2. Keep a pad of paper handy to jot down extraneous thoughts that cross your mind while studying. Get them out of your mind and onto paper.
3. Set study goals before you begin each period of study (number of pages, number of problems, etc.).
4. Design adequate rewards after specified goals are attained.
5. Break up the content of study by mixing up subjects and building in variety and interest and removing boredom.
6. Make the most of rest periods. Do something quite different.
7. Don’t try to mix work and play.
8. Start with short study periods and slowly build to longer periods only as fast as you maintain your concentration.
9. If necessary, make a calendar of events to clear your mind of distractions.
10. Plan the length of your study period by the amount of material you have decided to cover, not by the clock. (Often the clock is one of the most serious distracters.)
Get Organized  
*Source material unknown.*

**GRAPHIC AND SEMANTIC ORGANIZERS**

**What:** Graphic organizers are useful tools for arranging verbal information in a visual format.

**Who:** Organizers are especially helpful for students with strengths in visual processing and visual memory who have difficulty organizing, understanding, and remembering the large quantity of verbal information presented in college textbooks and lectures. Many students try to learn course information by memorizing isolated facts and procedures rather than trying to make the information meaningful. Organizers offer a strategy for approaching learning meaningfully, using students' strengths. They can also be helpful for students who have difficulty learning new vocabulary words; claim that they read their assignments over and over, but still do not know what they have read; or have difficulty planning their written products, such as essays, papers, and answers to essay questions on tests.

**Suggestions for using organizers:**

A. **Previewing a Textbook Chapter**
1. This process should take about five minutes, but will save you much reading and study time in the long run.
2. Use the graphic organizer labeled *Web Diagram*, or construct a similar one.
3. First, write the chapter title in the middle circle.
4. Next, fill in the four boxes connected to the Title circle with the main points being covered in the chapter. These can be easily identified by locating the major headings. Add extra boxes as needed to include all of the main headings.
5. Using the next level of headings, fill in the main points covered under each main heading, again, adding more boxes as necessary.
6. You now have an organizational structure that will assist you in understanding conceptually as you read. This, in turn, should reduce your need to reread. For many students, going through this quick exercise before listening to a lecture covering that text material will help them understand the lecture better as well.
7. Save your organizers, one for each chapter, to use as a quick reminder of the material covered. Check your retention of the information by trying to explain each of the headings.

B. **Planning a General Essay (e.g. Regents, CPE, in-class)**
1. Use the graphic organizer labeled *Branching Diagram-Three Divisions*. Add a box for the summary paragraph at the bottom of the organizer.
2. Write the topic, or title, in the top box.
3. Think of the three main points you wish to cover and write them in the next row of boxes.
4. List the ideas you wish to include under each main idea.
5. Your essay should begin with a paragraph specifying the main points identified.
6. Each main point should then be elaborated upon in separate paragraphs (at least one for each main idea).
7. Check to be sure you have included all the ideas on your lists.
8. Summarize and draw conclusions, as appropriate. Remember! This is not the place to add new information.
WEB DIAGRAM
BRANCHING DIAGRAM-THREE DIVISIONS
Using organizers: This process will save you much time and effort in the long run.

**Meeting the Specific Demands of a Writing Assignment**

1. Read the essay question or assignment to be sure you understand what your instructor is asking you to write about. Think of your instructor as your audience. Your goal is to communicate to that audience not just your knowledge of the subject at hand, but your ability to address the question. For example, if your instructor asked you to **compare and contrast** two different things, people, or concepts, you will not earn a good grade by writing everything you know about the two subjects. Or, if you are asked to discuss the **pro’s and con’s** of an issue, you will need to do more than explain the issue itself.

2. Choose one of the organizers or diagrams you have been given, or create one that fits the assignment or question. For example, you can use the diagram labeled **Compare and Contrast Diagram** if that is the assignment. Or, if you need to discuss the pro’s and con’s of an issue, refer to the appropriate **Essay Organizer Frame**. Note that these frames have some sample introductory and transitional phrases you can use to help the reader (your all-important “audience”) follow your organizational pattern.

3. Decide what information you want to include in each segment of your organizer or frame. Then, as you begin to write the essay or paper, be sure that you stick to the plan. For example, if you decide to write first about how two events are alike, then write about how they differ, do not confuse the “alike” paragraphs by mixing in differences. Save it for the “differences” paragraphs.

4. When you finish the first draft, read through the whole paper/answer to see if you followed your plan and to see if the ideas flow logically. After you are satisfied with your content, you can turn to the more mechanical aspects of writing, such as sentence structure, spelling, and punctuation.
SEMANTIC ORGANIZERS
Easy Organizer Frames

The topic of...  
is very controversial.

There are two sides to...

Some believe...  
One point of view is...

On the other hand...  
Although it is true...

Nevertheless...  
However,...

One could conclude...  
In summary...

There are two important views concerning...

One view is that...

In contrast...  
An alternate view to that is...

In spite of opposing views, there seems to be a compromise one...

From the above discussion it is possible to conclude...  
Therefore, in summary and conclusion...
Easy Organizer Frames Continued

The idea of...is still developing.

The basic idea is...

This idea has been further developed...

When these ideas are added to one another...

As ideas evolve, it is probable that...
In conclusion, the future looks...

There is a problem. One of the biggest problems in the world today is that of...

An in-depth analysis of the problem indicates that...
The heart of the problem is...

One solution is...
Although the problem is great, nevertheless, a solution is...

After analyzing this problem and the solution offered, it can be concluded that...
In conclusion, the problem...
Using organizers: This process will save you much time and effort in the long run.

Vocabulary Development

You can create a **semantic organizer** to help you **pronounce**, **understand**, and **remember** new words or to **clarify** aspects of words that have been confusing to you. Look at the sample diagram below. The semantic organizer was designed to help a student recognize the **form**, **sound**, and **content/meaning** of the word “dew” and connect it to the student’s **experiences/function**.

Elements of the diagram:

1. **Form**: “dew” is spelled like “new”.
2. **Sound**: “dew” is pronounced like “do” and “due”. The cross lines remind the student that although the words sound the same, they do not mean the same thing.
3. **Content/meaning**: these branches help define the meaning of “dew”, (droplets, on the grass).
4. **Function/Experience**: these branches give examples of the student’s own experience with “dew”, (camping, wet feet, morning).

When you create your own semantic organizers to help you learn new or troublesome words, feel free to include any branches that will trigger needed connections, clarify confusions with other words, and make the word a part of your vocabulary.
Section 2:
Taking Notes
NOTE-TAKING STRATEGIES

Six Techniques that Will Help You Learn More from Your Classes

1. **Use a binder.**
   - Use dividers to organize it.
   - Use a hole punch so you can insert handouts from class.

2. **Don't try to take dictation.**
   - Professors speak 150-200 words per minute. We write about 25 words per minute.
   - Leave out non-essential words.
   - Make sure you write down important points.

3. **Leave a 2 inch margin along the left side of each page of notes.**
   - Use a margin for adding questions during or after class.
   - Use questions to help you learn your notes later for tests.

4. **Use a modified outline when taking notes.**
   - Write a topic on one line.
   - Indent supporting details under it.
   - Leave several lines after the last point for adding information from memory or your textbook later.
   - *Note that this section is written as a modified outline.*

5. **Use abbreviations.**
   - Eliminate vowels.
   - Use word beginnings.
   - Use standard symbols from math or science.
   - Create your own abbreviations.

6. **Review your notes the same day you take them.**
   - Add questions in the margins.
   - Add additional information you recall from class.
   - When studying notes, cover your notes, read questions in the margin, and see if you can recall the answers.
   - Remember the forgetting curve.
     a. Most information is forgotten during the first 24 hours after notes are taken.
     b. Over a period of 9 weeks, reviewing notes the same day can make the difference between forgetting almost 80% of the information and remembering almost 80% of it.
FOUR COMMON LECTURE STYLES

1. FACTUAL
   • Chronological
   • Process
   • Enumeration or classification
   • Focus on facts, definitions, etc.
   • Purpose is to present and explain

2. CONCEPTUAL
   • Deductive (The lecturer gives the “punch line” first and then outlines all the related points. Pay attention at the beginning of the lecture.) or Inductive
     (The lecturer talks about several ideas throughout the lecture and then summarizes it into an important concept at the end of the lecture.)
   • Focus on broad, organizing ideas
   • Looks at trends, ideas, concepts

3. ANALYTICAL
   • Inductive or deductive
   • Focus on close study followed by interpretation

4. DISCUSSION
   • Cause and effect
   • Problem/solution
   • Focus on the exchange of ideas

Suggested Strategies to Compensate for the Discrepancy between Speaking and Writing Speeds

*The average rate of speech during a lecture is 100-125 words per minute, while the average rate of writing is 30 words per minute!*

1. Do not try to write word for word what the instructor says.
2. Ask other students in your class if they are also having difficulty keeping up. If this is the case, schedule a group appointment with the instructor to see if he/she is willing to slow down or modify his/her rate of speech.
3. Create a system of abbreviations.
   Ex: important=impt, social/sociology=soc, advantage=adv, politics=pol, with=w/, solution=sol, without=w/out, twenty=20, because=b/c
4. Develop a system of symbols to represent frequently used words.
   Ex: and=+, at=@, less than=<, greater than=>, number=#, positive/negative=+/–
5. Leave a gap or blank space in your notes when you get behind. After class, ask another student or the instructor to fill in the information gap.
6. Use a tape recorder to record the lecture. Make sure to ask the instructor’s permission first.
7. If you find that none of the above strategies work and your are feeling frustrated, you may discuss the possibility of getting a note taker with one of the Learning Specialists at the PMC.
More Strategies to Help You Select and Organize Appropriate Information during a Lecture

- Listen for **guide words/phrases** and look for **clues** that the instructor will usually give out to denote what he/she considers important in the lecture. For example:

<table>
<thead>
<tr>
<th>Guide Words/Phrases</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>above all</td>
<td>The instructor is going to present the main point (thesis) of the lecture or a main idea.</td>
</tr>
<tr>
<td>crucial/critical</td>
<td></td>
</tr>
<tr>
<td>more/most important or significant</td>
<td></td>
</tr>
<tr>
<td>remember</td>
<td></td>
</tr>
<tr>
<td>also</td>
<td>The instructor is going to present another main idea/example.</td>
</tr>
<tr>
<td>as well</td>
<td></td>
</tr>
<tr>
<td>in addition</td>
<td></td>
</tr>
<tr>
<td>briefly</td>
<td>The instructor is going to give an example to clarify the main idea.</td>
</tr>
<tr>
<td>simply stated</td>
<td></td>
</tr>
<tr>
<td>that is</td>
<td></td>
</tr>
<tr>
<td>in essence</td>
<td></td>
</tr>
<tr>
<td>in other words</td>
<td></td>
</tr>
<tr>
<td>for example</td>
<td>The instructor is going to give an example to clarify the main idea.</td>
</tr>
<tr>
<td>to illustrate</td>
<td></td>
</tr>
<tr>
<td>consequently</td>
<td>The instructor is going to present a summary or draw a conclusion.</td>
</tr>
<tr>
<td>in conclusion</td>
<td></td>
</tr>
<tr>
<td>therefore</td>
<td></td>
</tr>
<tr>
<td>to sum up</td>
<td></td>
</tr>
<tr>
<td>kinds</td>
<td>The instructor is going to list categories or identify a sequence.</td>
</tr>
<tr>
<td>stages</td>
<td></td>
</tr>
<tr>
<td>types</td>
<td></td>
</tr>
<tr>
<td>parts</td>
<td></td>
</tr>
<tr>
<td>steps</td>
<td></td>
</tr>
<tr>
<td>first, second, third</td>
<td>The lecturer is presenting a series or sequence.</td>
</tr>
<tr>
<td>but</td>
<td></td>
</tr>
<tr>
<td>however</td>
<td>The lecturer is saying that a different point of view or approach should be considered.</td>
</tr>
<tr>
<td>on the other hand</td>
<td></td>
</tr>
<tr>
<td>in contrast</td>
<td></td>
</tr>
<tr>
<td>nevertheless</td>
<td></td>
</tr>
<tr>
<td>yet</td>
<td></td>
</tr>
<tr>
<td>as a result</td>
<td></td>
</tr>
<tr>
<td>cause</td>
<td></td>
</tr>
<tr>
<td>for</td>
<td></td>
</tr>
<tr>
<td>reason</td>
<td></td>
</tr>
<tr>
<td>therefore</td>
<td>The lecturer is presenting causes and/or effects.</td>
</tr>
<tr>
<td>because</td>
<td></td>
</tr>
<tr>
<td>effect</td>
<td></td>
</tr>
<tr>
<td>if...then</td>
<td></td>
</tr>
<tr>
<td>since</td>
<td></td>
</tr>
</tbody>
</table>
The average rate of speech is 125 words/minute and the average person thinks at the rate of 400 words/minute. This discrepancy could lead to a decrease in attention and concentration, especially if the instructor speaks too slowly or dwells too long on one idea/example.

**Suggested Strategies for Staying Focused on Lectures**

1. Keep writing even if the details do not seem important to your notes.
2. Mentally summarize the main ideas and supporting details that have already been discussed.
3. Try to anticipate the instructor’s next point.
4. Mentally question the relevance of the information to the lecture topic.

**Strategies to Help You Select and Organize Appropriate Information during a Lecture**

1. Meet with your instructor to discuss problems you are having with your notes. Perhaps, your instructor may be able to help identify the source of your problems and offer suggestions based on his/her lecture style.
2. A lecture outline on the board or overhead will assist you to see the big picture and greatly enhance your ability to select and organize relevant information. If this is not provided already, suggest it to your instructor.
3. Pay attention to signal words that usually indicate the beginning of a new heading and help you identify what information should be found in supporting details, i.e. stages, techniques, disadvantages, advantages, benefits, causes, findings, purposes, solutions, functions, principles, ways, kinds of, types of, steps, methods, rules, uses, parts, etc.
4. Look for **clues/signals** given by the instructor, consciously or unconsciously, that indicate important points in the lecture.
   - repeated ideas or points
   - a change in his/her voice
   - a change in the rate of speech (slows down)
   - lists or numbers items
   - writes on the board or overhead
   - uses audiovisuals
   - makes a direct announcement, i.e. “This is important!”
   - uses nonverbal cues, i.e. gets excited, breaks chalk, pounds on the board or the lectern
   - uses over-exaggerated hand gestures
5. Use effective note-taking systems (i.e. Cornell—see next section).
6. Do not let spelling slow you down. Spell the word as best as you can by sounding the word out. Check your textbook or dictionary for the correct spelling after class.
7. Read assigned readings **before** the lecture to familiarize yourself with new terms.
Note-taking Systems

The following section will highlight four major note-taking systems that will help students to take effective notes from textbooks. Choosing the right note-taking system or combination of note-taking systems will depend on the individual student's learning style preference and the types and complexity of information contained in the textbooks.

Cornell System
The Cornell note-taking system was developed by Dr. Walter Pauk at Cornell University over 40 years ago to help students take more effective notes.

- Divide a lined 8 1/2” by 11” sheet of 3-ring paper into 3 sections.
- On the left side of the page, draw a vertical line down the page, leaving a 2 1/2” margin for questions and main ideas or key concepts.
- Write notes on the 6”-wide column on the right of the pages.

Marking System

- **Survey**: Take a few minutes to survey the chapter.
- **Read**: Read paragraph by paragraph or section by section. Turn headings into questions.
- **Underline/Highlight**: After you read each paragraph/section, identify the main idea and critical details, then underline or highlight.
- **Make Notations**: Add notes in the margins that indicate definitions, key terms, and examples. Add comments that reflect your reaction to the content.
- **Review**: Reread the material you have marked and written. Clarify your markings or notes before you stop studying.

Mapping System

- **Survey**: Take a few minutes to survey the chapter.
- **Read**: Read the chapter paragraph by paragraph.
- **Underline/Highlight**: At the end of each paragraph, identify the main idea and mark it along with any critical details and examples.
- **Map**: Decide which type of map you will use (comparison chart, informal outline, timeline, or cluster map) then map the key ideas.
- **Review**: Reread your textbook markings and map. Make changes to clarify.

SQ4R'S System

- **Survey**: Take a few minutes to survey the chapter.
- **Question**: Turn the first heading into a question then write it in your notebook.
- **Read**: Read the section under the heading. Change your question and/or add other questions in your notebook.
- **Recite**: Say out loud the answer to each question without looking back at the section.
- **Record**: Write your recited answer in your notebook.
- **Review**: Reread your notes and test your memory once more.
NOTE-TAKING EXERCISE USING THE MARKING METHOD

Do the following textbook note-taking exercise using an assigned chapter from one of your courses.

**Part I. Marking Your Textbook**

<table>
<thead>
<tr>
<th><strong>SURVEY</strong></th>
<th>Take a few minutes to survey the chapter.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>READ</strong></td>
<td>Read paragraph by paragraph or section by section. Turn headings into questions.</td>
</tr>
<tr>
<td><strong>UNDERLINE/HIGHLIGHT</strong></td>
<td>After you read each paragraph/section, identify the main idea and critical details then underline or highlight them.</td>
</tr>
<tr>
<td><strong>MAKE NOTATIONS</strong></td>
<td>Add marginal notes that indicate definitions, key terms, and examples. Add comments that reflect your reaction to the content.</td>
</tr>
<tr>
<td><strong>REVIEW</strong></td>
<td>Reread the material you have marked and written. Clarify your markings or notes before you stop studying.</td>
</tr>
</tbody>
</table>

**Part II. Evaluating the Textbook Marking Method**

How did this method affect your ability to learn the material in the chapter?

What are the advantages and disadvantages of this method?

Compare this method with the SQ4R Method. Which do you prefer and why?
Note-taking Exercise
Using the Mapping Method

Do the following exercise using a chapter from one of your assigned course readings.

Part I. Constructing a Textbook Map

| SURVEY | Take a few minutes to survey the chapter. |
| READ   | Read the chapter paragraph by paragraph. |
| UNDERLINE/HIGHLIGHT | At the end of each paragraph, identify the main area and mark it along with any critical details or examples. |
| MAP    | Decide which type of map you will use (comparison chart, informal outline, time line, or cluster map) then map the key ideas. |
| REVIEW | Reread your textbook markings and map. Make changes to clarify. |

Part II. Evaluating the Mapping Method

Did you have difficulty constructing the map? If so, explain why.

Choose one concept covered in the chapter and explain how this method either did or did not help you understand the concept better.

Was the Mapping Method effective in helping you remember the material better?

Which of the 3 methods (SQ4R, Marking, or Mapping) seems to work best for you? Explain.
Section 3:
Test and Exam Preparation
Getting Organized Before Exams

Source material unknown.

1. Find out as much information about the exam as possible from the professor and the course syllabus. For example:
   - What material it will cover
   - How long it will be
   - How much each part of the exam is worth
   - What type(s) of exam it will be (i.e. multiple choice, essay, short answer, matching, etc.)
   - What major themes/topics will be covered or emphasized

2. Identify what you need to review.
   - Chapters
   - Lectures and textbook notes
   - Assignments
   - Films/videos
   - Lab assignments
   - Old tests and past exams
   - Study guides

3. Determine how much time you will need to study for each course and plan accordingly using a weekly study schedule.

General Exam Preparation Tips

- Start early to avoid cramming.
- Make a master schedule and include all your essays, tests, assignments, and exams at the beginning of the term.
- Create and maintain a healthy environment in which to study (i.e. free from distractions, equipped with pens, paper, books, and other items necessary for productive study).
- Keep up with required reading and take good lecture notes. Review your reading and lecture notes regularly.
- Form a study group.
- Rewrite lecture and textbook notes in your own words.
- Use 3x5 index cards for definitions, terms, or key concepts.
- For essay exams, integrate and organize materials around themes discussed in the course. Outline answers to possible questions and commit to memory.
- For multiple choice exams, study details so that concepts are easily recognized.
**Study Session Review Form**

Use this form to help you list what you need for each exam and how much time you will need to allocate to the task.

<table>
<thead>
<tr>
<th>Material to Study</th>
<th>Missing Material</th>
<th>Time Needed for Reviewing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
EXAM WRITING STRATEGIES

Understanding Exam Anxiety

Understanding anxiety begins with understanding stress. Stress is your reaction or response to events or situations that threaten to disrupt your normal pattern or routine.

**Stress** can work for you when:
- a.) You are able to recognize that a specific event is causing stress.
- b.) You are able to maintain control of your reaction to the stress.
- c.) The stress motivates you to search for solutions to the situation.

**Anxiety** (when stress becomes excessive) can interfere with your ability to recognize the source of your stress, gain control of the situation, and begin the search for solutions. In a test/exam situation, anxiety is focused inward. It usually begins with negative emotional thinking or reactions that trigger physical symptoms or behavioral reactions (i.e. rapid heartbeat, increased blood pressure, headaches, nausea, upset stomach, poor concentration, blank mind, disorientation).

**Signs of anxiety** include:
- Panicky or depressed feelings
- Procrastination
- Short temper
- Negative self-talk that reflects feelings of low self-esteem and low confidence in oneself

The two most common sources of exam anxiety are **under-preparedness** and **negative past experiences**. Anxiety that stems from under-preparedness can be easily reduced or eliminated by using effective study strategies. Exam anxiety caused by negative past experiences, on the other hand, is more difficult to deal with because of the complexity and the dynamics of belief systems, established behaviors, and emotions.

**Strategies for Coping with Exam Anxiety**

1. **Prepare yourself emotionally.**
   - Seek support and cooperation from roommates, family, or friends.
   - Use affirmations, self-talk, and visualizations to get yourself into a positive mental state and build self-confidence.
   - Study with a study partner or group.
   - Use any one or combination of the following relaxation techniques:
     - **Soothing Mask Technique**
       Close your eyes. Place your hands on top of your head. Slowly move your hands down your forehead, down your face, and to your neck. As you are doing this, picture your hands gently pulling a soothing mask over your face. Block out distracting thoughts, worries, fears, and stress from your mind while keeping your eyes closed for another minute or two. Feel the soothing mask resting on your face.
     - **Deep Breathing**
       Take a deep breath to fill your lungs. Repeat. Now slowly exhale and feel your body relax. Repeat this exercise several times. Choose another exercise if you experience dizziness or light-headedness.
c. **Breathing by Three**
   Inhale slowly through your nose as you count to three. Gently hold your breath as you count to three. Exhale slowly through your nose as you count to three. Repeat this exercise several times until you feel your body is beginning to slow down and relax.

d. **Perfect Place**
   This technique combines breathing with visualization. Breathe in slowly. As you breathe in, start creating a perfect place in your mind where you feel relaxed, confident, safe, happy, and comfortable. Breathe out slowly and keep imagining your perfect place. Continue this process for a few minutes until you feel relaxed.

2. **Prepare Yourself Physically**
   - Get a good night's sleep the night before the test/exam.
   - Allow time for a healthy breakfast to build up your energy level.
   - Equip yourself with the necessary supplies (pencils, pens, calculator, dictionary, etc.).
   - Arrive early.

3. **Prepare yourself academically.**
   - Preparing yourself academically with good and consistent study habits will greatly reduce exam anxiety in the long run.

**General Strategies**

- Arrive early to get ready.
- Write down important information on a piece of scrap paper (formulae, lists, facts, mnemonics, etc.).
- Listen to directions carefully.
- Survey the test/exam for the following:
  1. the types of questions
  2. whether questions are printed on the backs of pages
  3. where to place your answers
  4. the point value assigned to each question or section
  5. the length of the test/exam
- Budget your time according to the point value assigned to each section of the test/exam. Allow time to go over the exam at the end.
- Read all directions carefully.
- Circle direction words and underline key terms in directions and questions to help you keep focus on the task at hand.
- Use a blank piece of paper to block off the rest of the questions to help you focus on one question at a time.
- Answer the easiest questions first. This will help boost your confidence.
- Attack each question systematically. Think how you are going to answer before you begin to write.
- If you get stuck on a question, skip the question and go on to the next. Make sure to put a check mark next to the skipped question so that you can go back to it.
- Ignore other students.
- If you have time, go over your exam and make necessary changes.
Strategies for Different Types of Exams

Multiple Choice Exams
- Avoid superstitious or irrational behavior. Don’t look for patterns of answers.
- Answer the questions in the order they are given. Mark questions that you are unsure of and go back to them later.
- If a question contains information that appears confusing to you, write it in your own words.
- Try to determine the correct answer before looking at the choices.
- Cross out wrong answers until you arrive at the right answer.
- If you do not know the answer, guess, provided that there is no penalty for guessing.

Some Guidelines for Guessing
- If one option is much longer than the others, it is likely to be the right answer.
- Options which do not allow for exceptions or contain 100% modifiers are usually wrong (options that have words like “always”, “never”, “all”, “no”, “none”, “not”, “must”).
- When options have numbers or ranges in values, pick one of the middle range alternatives.
- The correct response is usually grammatically consistent (in gender, verb tense, number, etc.)
- If two of the answers are relatively similar, one of them is sure to be the correct one.
- The key is to look for the obvious answer. Test makers tend to prefer concrete, tangible answers.
- If an “all of the above” option is given, choose it.
- Eliminate foolish or insulting options.
- Eliminate options with unfamiliar terms.
- Choose the most inclusive option.

Fill in the Blank Exams
- Look for key words or terms in the sentence (assisted response).
- Decide what type of information is required.
- If an immediate response is not available, try the following delayed response strategies:
  1. Search your memory for the general category or topic related to the information in the sentence.
  2. Once you have identified the category, search your memory for specific details.
  3. Turn the sentence into a question.
- Use the grammatical structure of the sentence to determine the type of word called for. For example, when a blank is preceded by the word “an”, give an answer that begins with a vowel (“a”, “e”, “i”, “o”, “u”).
- When a question contains two blanks with a space between them, give a two word answer.

True/False Exams
- Watch for qualifying words and phrases that tend to restrict the truth of the statement (i.e. “all”, “absolutely”, “some”, “none”, “never”, “completely”, “always”, “usually”, “frequently”, “most of the time”, etc.).
• Read two part statements carefully. Both parts of a statement must be true for the whole statement to be true.
• Look for negatives and double negative statements. Two negatives cancel each other out.
• If you don’t know the answer, guess. Remember, absolute statements tend to be false, and mark any unfamiliar terminology or facts as false (i.e. “all”, “absolutely”, “every”, “none”, “never”, “completely”, “always”, “worst”, “only”, “best”, etc.). Statements that contain in-between modifiers, on the other hand, are more likely to be true (words such as “some”, “few”, “often”, “usually”, “seldom”, “most”, etc.).
• Questions that state reasons tend to be false, either because they state an incorrect reason or because they do not state all the reasons.

**Computation or Math Exams**

• Write down formulae, rules, decision rules, and definitions from memory on a piece of paper before beginning the exam.
• When reading a question, underline each item of data, the units that accompany the numbers, and the specific instructions that tell you what to do.
• Draw a picture or a diagram to help you visualize the problem presented by the question.
• Identify what it is that you are to find and give “it” a name.
• If you have seen the problem before, try to outline how you solved the other problem.
• Don’t get stuck on one problem. Move on to another problem and go back to it if you have time.

**Matching Exams**

• Examine the two columns carefully to determine their overall pattern of relationship.
• Answer the questions you are sure of first and cross off items that are used.
• Make sure you check all available choices before answering a question.

**Essay Exams**

• Identify the direction word and plan to do only what is required by it. (See the **Short-Answer** section for a list of common direction words.)
• Write a strong thesis sentence stating your main point in the introduction. A thesis sentence for an essay exam:
  1. should clearly state the topic of the essay
  2. can include key words that are part of the question
  3. may indicate a given number of main ideas you wish to discuss
  4. should show that you understand the direction word
• Identify the main ideas and plan your essay by mapping or by creating an outline hierarchy.
• Expand or develop each of your main ideas into paragraphs.
• Use an outline, hierarchy or mapping to guide you. When writing consider the following tips:
  1. Write as though you are explaining to an uninformed reader.
  2. Write in complete, concise, and clear sentences. Avoid wordiness.
  3. Incorporate as many key vocabulary terms as possible in your paragraph.
  4. Indent for every new paragraph.
  5. Write clearly and on every other line.
6. Write only on the right-hand pages of your exam/test booklet, so that you can make changes and additions on the left-hand pages.
   - Summarize your main ideas. The summary or concluding sentence should reflect the same information you used in your thesis statement.
   - Proofread your work for logical, spelling or grammatical errors.

**Short-Answer Exams**

*Common Direction Words Used in Short-Answer Questions*

<table>
<thead>
<tr>
<th>Direction Word</th>
<th>What is Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discuss/Tell/Name</td>
<td>Tell about a particular topic.</td>
</tr>
<tr>
<td>Identify/What are?</td>
<td>Identify specific points.</td>
</tr>
<tr>
<td>Describe</td>
<td>Give more specific details or descriptions.</td>
</tr>
<tr>
<td>Explain/Why?</td>
<td>Give reasons.</td>
</tr>
<tr>
<td>Explain how/how?</td>
<td>Describe a process or a set of steps. Give the steps in chronological order.</td>
</tr>
<tr>
<td>When?</td>
<td>Describe a time or a specific condition needed for something to happen, occur, or be used.</td>
</tr>
</tbody>
</table>

- Identify the direction word and know what is expected.
- Make a mental plan of your answer with key ideas or write one down on a piece of scrap paper.
- Check to see how many points are assigned to each question. Let this be your guide to how much information is required for each answer.
- Write a strong, focused opening sentence.
- Add three or more sentences with specific details.

**Science Exams**

- Translate a problem into words to help you understand what the question requires.
- Perform opposite operations.
- Analyze the problem before you begin to solve it.
- Draw a picture or diagram to help you visualize the problem.
Section 4: Essay Writing
Essay Writing

Source material unknown, unless otherwise stated.

Four Common Mistakes Students Make when Writing an Essay:

- Topic too broad
- No target audience
- Insufficient research
- Poor organization

In the art of effective essay writing, there are essentially 3 basic stages or steps: preparation, writing, and revision. The following section will describe in details the basics of the writing process as well as provide some useful information related to essay writing, for example, tips on how to avoid plagiarism.

The 1 2 3 of Essay Writing

Step I: Preparation and Research

1. Clarify any unclear assignment requirements with the instructor.
   - Has the topic been pre-assigned or can you choose your own topic?
   - How long should the paper be?
   - Check with your instructor to make sure you understand exactly what the pre-assigned essay question is asking. (See chart in this section for specific definitions of commonly used verbs in essay questions).

2. Set deadlines and writing schedules for all your papers.
   - For each paper, set incremental deadlines for each of the three stages of essay writing.
   - Record and keep track of all your deadlines, whether they are your own or those set by your instructors, using a time management tool (e.g. student planner, 4-month calendar, etc.).

3. Choose a topic.
   - Select a topic that is relevant to the course and that interests you.
   - Determine the availability of information on potential topics.
   - Check the bibliographies in textbooks and other relevant reference books.
   - Use the CUBE System in the library.
   - Narrow topics according to the length of paper.

4. Generate ideas.
   - Brainstorm ideas on the topic.
   - Identify and circle ideas that are relevant to the topic.
   - Discuss the topic with classmates and/or instructors.

5. Refine initial ideas.
   - Select a specific topic and working title.
   - Write a rough thesis statement that is clear and to the point.
   - Consider your audience and the purpose and content of your paper.

6. Research.
   - Use your professor and T. A. as resources.
   - Use your required textbooks for reference to other sources.
   - Use the CUBE System and the CD ROM Services in the library.
   - Skim the resources you have selected to determine whether they contain material which is relevant to your topic and thesis.
   - Make a list of all your sources. For books include information on the author, the title, the publisher, where published, and the date of publication. For
periodicals include the following pieces of information: the author, title of article, name of periodical, date, volume, and pages. (Refer to the bibliography section for information on how to put the information together properly.)

- Take notes on material you intend to use in your paper using 3x5 cards.
- Limit one idea per card so that you can easily sort them into order of your outline later on.
- Use quotation marks whenever you use the author's exact words so that you will be sure to give appropriate credit in a footnote.
- Make sure to write down the page number and title of your source on the card.

7. Construct an outline.
   - Refine your draft thesis.
   - Structure your outline using this format: introduction (include thesis), body (main points and supporting details), and conclusion (summary of your thesis and main points).
   - Select the main points you want to make in argument for your thesis as main headings.
   - List supporting details for each main point as sub-headings under the main heading.
   - Order the main points of your thesis in a logical manner, for example, chronologically or from strongest to weakest points, etc.
   - Be flexible when making an outline. It may take some reorganizing and rearranging until you get it the way you want it.

**Step 2: Writing**

1. Write a rough draft of your paper using your outline as a guide to organize and sequence.
2. Write rapidly and spontaneously. Remember this is only a draft.
3. Make sure your paper has a clear introduction, body, and conclusion.
4. Go over the rough draft to smooth out any rough spots.

**Step 3: Revision**

1. Set the paper aside for a few days before revising (only if you have time!). This will help you to achieve a greater sense of objectivity.
2. Read the paper for logic and flow.
   - Is it well organized?
   - Does it adequately cover the topic?
   - Should you remove any irrelevant information?
3. Check for technical quality of the paper (grammar, sentence structure, spelling, and punctuation).
4. Seek objective feedback from a friend, classmate, tutor, T. A. or instructor.
5. Read your paper out loud to detect awkwardness you may have missed while reading to yourself.
## The 3 Essential Components of an Essay

<table>
<thead>
<tr>
<th>Introduction</th>
<th>Body</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provides your essay with direction and interest and sets the tone for the essay</td>
<td>• Develops the thesis by supplying evidence to support the argument proposed in the thesis</td>
<td>• Reminds the reader of the main topic, purpose and thesis</td>
</tr>
<tr>
<td>• Provides the reader with preliminary information or background observations about the topic under discussion</td>
<td>• Contains the main ideas and the supporting details</td>
<td>• Explores greater implications and general significance of the topic</td>
</tr>
<tr>
<td>• States the thesis clearly and concisely (usually at the end of the introduction)</td>
<td>• Each section or main heading should be clear and organized in a logical manner</td>
<td>• Convinces the reader of the topic's value</td>
</tr>
</tbody>
</table>

## CHECKLIST FOR ESSAY WRITING

- Is my title interesting and/or informative?

- Does my essay have a central thesis? Is the thesis clearly stated in the introduction?

- Is the subsequent argument well organized, and does it effectively develop the central thesis?

- Is my introductory paragraph informative and interesting?

- Is every paragraph unified by a strong topic sentence or topic ideas? Does each paragraph lead logically to the next?

- Is my prose style clear, concise, and vigorous?

- Is the tone of my essay appropriate, given its audience and subject matter?

- Does my essay provide the sense of a beginning, a middle, and an end?

- Have I supported my ideas and generalizations with concrete facts and details and with suitable quotations?

- Is the final copy of my essay in the required format? Are all sources accurately quoted and acknowledged?

- Has the final proofreading eliminated typographical mistakes and minor errors of spelling and punctuation?
<table>
<thead>
<tr>
<th>Some Useful Transitional Expressions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>If you want to:</strong></td>
</tr>
<tr>
<td><strong>ADD</strong></td>
</tr>
<tr>
<td><strong>COMPARE</strong></td>
</tr>
<tr>
<td><strong>CONTRAST</strong></td>
</tr>
<tr>
<td><strong>CONCEDE (a point)</strong></td>
</tr>
<tr>
<td><strong>EMPHASIZE</strong></td>
</tr>
<tr>
<td><strong>ILLUSTRATE</strong></td>
</tr>
<tr>
<td><strong>PLACE</strong></td>
</tr>
<tr>
<td><strong>QUALIFY</strong></td>
</tr>
<tr>
<td><strong>GIVE A REASON</strong></td>
</tr>
<tr>
<td><strong>SHOW A RESULT</strong></td>
</tr>
<tr>
<td><strong>SUMMARIZE</strong></td>
</tr>
<tr>
<td><strong>PLACE IN TIME</strong></td>
</tr>
</tbody>
</table>

*Phrases taken from *Evergreen, a Guide to Writing, Fawcett/Sandberg*
IMPORTANT WORDS IN ESSAY QUESTIONS

Analyze- Discuss the whole in terms of the parts, e.g. a process in terms of steps, a theory in terms of components. Describe the whole, identify the parts, show how the relationship between the parts makes the whole.

Assess/Evaluate- Carefully appraise the problem, citing both advantages and limitations. Emphasize the appraisal and, to a lesser degree, your personal evaluation.

Compare- Look for qualities or characteristics that resemble each other. Emphasize similarities among them, but in some cases, mention the differences.

Contrast- Stress the dissimilarities, differences, or unlikeness of things, qualities, events or problems.

Criticize- Express your judgment about the merit or truth of the factors or views mentioned. Give the results of your analysis of these factors, discussing their limitations and good points.

Define- Give concise, clear, and authoritative meanings. Don’t give details, but make sure to give the limits of the definition. Show how the thing you are defining differs from things in other classes.

Describe- Recount, characterize, sketch, or relate in sequence or story form.

Diagram- Give a drawing, chart, plan, or graphic answer. Usually, you should label a diagram. In some cases, add a brief description or explanation.

Discuss/Examine- Examine, analyze carefully, and give reasons, pros and cons. Be complete and give details. Also may give examples.

Enumerate- Write in list or outline form, giving points concisely one by one.

Explain- Clarify, interpret, and spell out the material you present. Give reasons for differences of opinion or results, and try to analyze causes.

Identify- Answer the questions who, what, where, when, why, and how, as appropriate.

Illustrate- Use a figure, picture, diagram, or concrete example to explain or clarify a problem.

Interpret- Translate, give examples of, solve, or comment on a subject, usually giving your judgment of it.

Justify- Prove or give reasons for decisions or conclusions, taking pains to be convincing.

List- As in “enumerate”, write an itemized series of concise statements.

Outline- Describe using main and subordinate points.

Prove- Establish the validity of something, using facts or logical rationale.

Relate- Explain the relationships between things.

Review- Give a summary, discussing the major points.

Summarize- Identify and discuss major points.

Trace- Show the progression and development of an event, trend, concept, etc.
PLAGIARISM

Passing off someone else’s words or thoughts as your own is a serious academic offense. The consequences of plagiarism may range from failure in the course to expulsion from the university. There are two common types of plagiarism: substantial and completed. Substantial plagiarism exists when there is no recognition given to the author for borrowed phrases, sentences, and ideas. Completed plagiarism exists when an entire essay is copied from an author or composed by another person and presented as original work. For more information or guidelines on academic plagiarism, consult your instructor or department/faculty.

Tips on Avoiding Plagiarism

- Rephrase the author’s ideas or thoughts in your own words.
- Consult your instructor or department/faculty for guidelines or policies on academic plagiarism.
- Footnote all your sources. Footnotes are references to quotations, ideas, or statements which are taken from another author. There are two commonly used styles for citing sources:
  1. Turabina Style: Label the quotation or idea with a number, and put the author, title, publisher, year of publication, and page number either at the bottom of the page or all in one list at the end of the paper.
     
     **Example:**
     “Footnotes are of two kinds, reference and content.”
     
     (bottom of page)

     1 Kate L. Turbian, Students’ Guide for Writing College Papers, 2nd edition, revised.
  2. American Psychological Association (APA) Format
     Put the source’s last name and year of publication in parentheses after the idea or quotation.
     
     **Example:**
     “Footnotes are of two kinds, reference and content.” (Turabian, 1969)

- Use direct quotations (see next page).

References

*Reference styles depend on the discipline for which the essay is written. Check with the T.A., your instructor, or a recognized journal from that discipline for styles of referencing.
How to Use Direct Quotations Properly

Short Prose:
Short, direct prose quotations should be incorporated into the text of the paper and enclosed in double quotation marks. Always smooth the quotation into your work by introducing it somehow with your own words and with the correct punctuation.

If you are using a complete sentence, use a comma.
**Example:** In conclusion he stated that, “what we need to learn is to be our own masters.”

If you are quoting only part of a sentence, no punctuation is necessary.
**Example:** In conclusion he stated that we need “to learn to be our own masters”.

If you introduce the quotation with an appositive expression such as “the following”, “as follows”, “these words”, etc. precede the quotation with a colon, just as you would in a normal sentence not involving a quotation.
**Example:** In conclusion he stated the following belief: “What we need to learn is to be our own masters.”

Long Prose:
A prose quotation of two or more sentences, or which runs four or more typewritten lines, should be offset from the text in single spacing and indented four spaces from the left margin. It may follow the standard essay margin on the right. It will have **no quotation marks** at the beginning or end, unless there were quotation marks in the original (dialogue, for instance). Precede it with a colon.

**Example:**
Hawthorne consistently viewed his Puritan ancestors as gloomy, joyless, and rigid. Apparently, Hawthorne’s view of the Puritans distorted his picture of the past. As Hyatt Waggoner puts it:

*Despite his long absorption in Puritan writings, it is pretty clear that Hawthorne had a typical nineteenth-century view of his ancestors. He exaggerated their gloominess and their intolerance and probably attributed their persecution of sexual offences to ideas other than those they actually held.*

BIBLIOGRAPHY

The bibliography is a list of sources used in the presentation of your work, including books, articles, and other materials. It is compiled in alphabetical order by the first word (name or title) of each entry and is placed at the end of the paper. The following page contains examples of bibliography entries as they would appear in a completed essay.
How to Prepare a Bibliography

BOOKS

Single author:

Two authors:

More than two authors:

Editor:

Title only:

Organization (Corporate Author):

Government Publication:

Thesis:

Dictionary:

Encyclopedia:

Periodicals:
COMMA RULES

1. **Series:** Place a comma after each item and before the connecting word in a series of words, phrases, or clauses.
   - Ex. The available colors are blue, green, red, and white.
   - Ex. Kevin agreed to unlock the office, Stacie will open the mail, and Alvin will check the equipment in my absence.

2. **Coordinate Adjective:** Place a comma between two or more adjectives.
   - Ex. It has been a long, exhausting week.
   - Ex. I saw the sad-faced, elderly-looking gentleman as he walked across the street.

3. **City/State:** Place a comma after the city and after the state.
   - Ex. I will be in Savannah, Georgia, on May 20th.

4. **Dates:** Dates containing two or more date references require commas between the date references and after the last reference (day of week, month, year, calendar date).
   - Ex. Our books were audited on February 28, 1997, by the IRS.
   - Ex. Our books were audited on Tuesday, February 28, 1997, by the IRS.
   - Ex. Our books were audited on Tuesday, February 28, by the IRS.
   - Ex. Our books were audited in February, 1997, by the IRS.

   Calendar dates expressed in single units do not require commas.
   - Ex. Our books were audited in February by the IRS.
   - Ex. Our books were audited in 1997 by the IRS.

5. **Appositive:** (renames noun) Place a comma before and after the appositive.
   - Ex. Reports are submitted to Mr. Jones, our sales manager, for approval.

6. **Parenthetical:** Place a comma before and after a parenthetical idea. This idea may be one word, a phrase, or a nonrestrictive idea. Notice the difference between a parenthetical idea and an adverbial conjunction.
   - Ex. The typist, not the secretary, prepared the letter.
   - Ex. The typist, however, prepared the letter.
   - Ex. The typist, therefore, prepared the letter.

7. **Introductory:** Place a comma after an introductory word, phrase, or dependent clause.
   - Ex. Remember, send the registration fees by May 1st.
   - Ex. If you want to participate, send the registration fees by May 1st.
   - Ex. (Send the registration fees by May 1st if you want to participate. (A comma is not needed, because the independent clause precedes the dependent clause; therefore, the introductory rule does not apply.)

8. **Adverbial Conjunction:** (however, therefore, nevertheless, furthermore) Place a semi-colon before and a comma after an adverbial conjunction. These conjunctions separate two independent clauses. Notice the difference between a parenthetical idea and an adverbial conjunction.
• Ex. She liked the dress; therefore, she bought it.

9. **Compound Sentence**: Place a semi-colon between independent clauses that do not contain a conjunction.
   - Ex. Several salespersons will reach their goals this month; they will earn a bonus trip to Hawaii.
   - Ex. Kevin agreed to unlock the office; Stacie will open the mail; Alvin will check the equipment in my absence.

10. **Coordinate Conjunction with Internal Punctuation**: If the sentence contains words, phrases, or clauses that require internal punctuation (series, appositive, parenthetical, introductory, etc.) then use a semi-colon before the coordinate conjunction. Otherwise, place the internal comma(s) according to the rule that requires punctuation.
   - Ex. She planned to attend the meeting; but, as you can see, several factors interfered with her plans. (parenthetical)
   - Ex. She planned to attend the meeting; but several factors, as you can see, interfered with her plans.
   - Ex. She planned to attend the conference, brunch, and meeting; but several factors, as you can see, interfered with her plans. (series)

**Additionally, if you have sentences that contain more than one of these comma rules, punctuate according to the rule that applies. For example:**

*Even though it has been a long, exhausting week, I will be in Savannah, Georgia, on Tuesday, May 20, 1997, for a conference.* (coordinate adjective, introductory, city/state, date)
Section 5:
Reading Difficult Material
Tips for Reading Difficult Material
Adapted from *College Reading and Study Skills* by Nancy V. Wood, Holt Rinehart and Winston, Inc. 1991 by the University of St. Thomas' ISS Learning Center

- **Read the title and the first paragraph.** Now decide if you have enough background to begin reading. Get a grasp of how the material is organized. If you need more background, get some from another source.

- **Look for main ideas.** Look for titles, headings, and subheadings. Pick out topic sentences. Utilize graphs, charts, and diagrams.

- **Look up words.** Look up words whose meanings are important to your understanding of the material, but you cannot discern from the context.

- **Monitor your comprehension.** Periodically stop and ask yourself, "What have I learned?" Connect this to what you already know.

- **Reread.** If you are not comprehending an idea, go back and reread. Restate difficult ideas in your own words.

- **Read to the end.** Do not get discouraged and stop reading. Ideas can become clearer the more you read. When you finish reading, review to see what you have learned and reread those ideas that are not clear.

- **Write while you read.** Underline, make notes, and/or write summaries that help you concentrate while you read.
Section 6: Study Tips for History Courses
General Tips for History Courses
(a condensed summary)
Source material unknown.

READING

- Pre-skim; set purpose and objectives; formulate questions.
- Read—ACTIVELY—to answer questions.
- Recall—immediately and cumulatively—by using a combination of underlining and marginal notations.
- Reflect. It's one thing to know what the author says and another to know what you think about it. Set aside time to reflect, criticize, note patterns and themes. Make notes about your reflections.

NOTE-TAKING

- Before class: At least pre-skim related readings and review lecture notes from the previous class. Formulate questions.
- During class: Adapt a "2-5-1" notebook page format which allows a wide left-hand margin for outlining and summarizing the notes and a narrow right-hand margin for recording your own insights, questions, criticisms, etc.
- After class: Recall and organize your notes as soon as possible.

PREPARING FOR EXAMS

- Review via ACTIVE RECALL rather than passive rereading.
- Use recall clues left in margins of your text and notes.
- Reorganize all materials into categorical summaries—economic, diplomatic, religious, cultural, etc.
- Practice using the information in the form that will be required by the test format—make up and practice answering questions with succinct justifications of your own theses, insights, etc.
- Most study time should be spent in active recall and application of the material rather than just simple "review".

TAKING ESSAY EXAMS

- Read all questions first and focus on exactly what is being asked—e.g. discuss, contrast, trace, justify, evaluate, critique, etc.
- Note and allot time per question according to percentage weight of each question and save ample time at the end to reread and edit.
- Start with the easiest question just to warm up.
THE WRITING OF A HISTORY ESSAY EXAMINATION

Author Unknown
Revised/Shirley Henderson 10/90
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I. What to Look For

The first step in the successful writing of a history essay is to read the question carefully and understand what is being asked. Many writers spend their time writing "around" a question because, by failing to grasp immediately the essence of a question, they fail to perceive what the professor wants discussed.

For example: "Without the contributions of George Washington, the rebelling Colonials would never have won the Revolutionary War. Discuss." In this question you are not being asked to recite a memorized factual summary of the contributions of George Washington to the revolutionary effort, nor are you being asked to spit back the major battles of the war. Rather, you are being asked for an evaluation of Washington's contributions—a critical assessment made by yourself and based upon the knowledge which you have acquired, not memorized, from the lectures and readings—with references to the indispensability of such contribution.

II. Types of Questions

You may be called upon to "discuss", "trace", "compare and contrast", "write an essay", "evaluate", etc. Do not be taken off guard by the imperative verb because all you are being asked to do is deal with an historical problem, usually one in which scores of scholars already have written thousands of pages, no five of the "experts" in total agreement. The verb within the questions is the professor's method of channeling your answer in a certain direction. Note the following examples, all treating a single problem, yet each a little different because of the imperative verb:

a. "Discuss the role of sea power in gaining the eventual victory over the British in the Revolutionary War."

b. "Compare and contrast American and British sea power accomplishments during the Revolutionary War."

c. "Trace the development of American sea power showing how it proved decisive during the Revolutionary War."

d. "Write an essay on the effectiveness of American sea power during the Revolutionary War."

e. "Evaluate American sea power during the Revolutionary War."

A second type of question begins with "what", "why", "how", etc. Examples:

"How did American sea power facilitate the victory over the British in the Revolutionary War?" and "What accounts for the effectiveness of American sea power during the Revolutionary War?"

A third type of question, the "What if you were", or "Let's pretend" type, is less frequently used by professors. An example of this sort is:
"If you were John Paul Jones writing during the Revolutionary War, how would you phrase a note to the Continental Congress requesting appropriations for further naval supplies?"
This kind of question calls for an understanding of the historical period, an imaginative mind, and a good deal of empathy.

III. Method of Answering

To the historian (and that means you by reason of your major or simply because you are enrolled in a history course) the most important part of his writing, be it an examination, book, or polemic, is the thesis. To the ordinary world (non-historians), what the historian calls a thesis is nothing more than "the point he's trying to make". But to us of the in-group, a thesis is a thesis. For instance, in answering the question about George Washington's contributions to the war effort, you may have contended that he was not indispensable. To you, that was a statement of your opinion, interpretation, point of view, etc. But to the historian that was your thesis! Consequently, from now on you will not write an opinion in an essay; you will write a thesis.

Every essay should have a thesis, a consistent and logical arrangement which runs throughout your entire essay. Some questions lend themselves more readily to theses. Nevertheless, if your essay is going to say anything worth reading, there should be a thesis consistently developed within. Most of you are familiar with the first four notes of Beethoven's Fifth Symphony, but if you listen closely to the symphony, and the First Movement in particular, you will notice that Beethoven continually returns with those original four notes as if to remind his listeners of the boldness of the introduction. You, too, in writing an essay, must present a bold first four notes, in this case your thesis, and develop throughout the essay the proof of those four notes (thesis).

In presenting your answer, use this standard format:

A. Introduction
B. Body
C. Conclusion

A. The introduction to your essay should be bold, direct, and assertive—it should present in general (or specific) terms the point that you intend to prove in your essay. This, to the historian (and you), is the presentation of the thesis. (Remember Beethoven's first four notes!) An example of such a presentation in answer to the George Washington question is:

"Throughout the Revolutionary War period, George Washington, as Commander-in-chief of the Continental Army, waged a war against great odds in attempting to evict from North America the legions of British troops intent upon quashing a pesky colonial uprising. From 1776 until eventual victory in 1783, Washington played a decisive role in prosecuting the war, a role which in the long run appears to have been indispensable."

or perhaps:

"No man is ever indispensable, least of all George Washington in his role as Commander-in-chief of the Colonial Army during the Revolutionary War. Certainly
Washington made contributions to the Colonial effort, but in the long run others in the
army could have performed at least equally as well as the Father of his Country."

B. The body of your essay is where you use the facts you have learned to prove the
validity of your opening position—your thesis.

There are three general ways in which the body of an essay can be constructed:
1. the chronological
2. the categorical
3. the stages-of-development

Others may be used, but these are the most common.

1. Using the chronological approach you simply present the factual proof of your thesis
in chronological order. With reference to our George Washington example, proof of
Washington's indispensability might be structured something like:

"In 1776 George Washington, who played an indispensable role when he..." (and here
would follow details of Washington in that year).

"Again in 1778, one can discern the indispensable character of Washington when he..."
(more specifics).

"Finally, in 1783 at Yorktown, Washington's indispensable action in the securing of..." (more).

(Note carefully that in each paragraph in which fresh, chronologically-arranged
information was presented to prove my thesis, I included a direct or indirect reference
back to the thesis—i.e. the indispensable role played by George Washington during the
war. This is what Beethoven does, too.)

2. In the categorical approach, the proof within the Body of your essay is ordered
according to categories of action rather than by dates. Here are the general categories
historians use with the acronym STAMPIERE to help you remember them.

S=social
T=technological
A=administrative
M=military
P=political
I=intellectual
E=economic
R=religious
E=external (foreign policy)

Very seldom, if ever, are all of these categories applicable to a single question. This
method is especially useful in answering broad general questions such as: "What
changes took place in America during the Jacksonian Era?" Here you may discuss the
era with reference to the social, administrative, political, intellectual, economic,
religious and external developments.

3. In the stages-of-development approach, you are usually being asked to treat complex
developments over a long period of time. By using the stages-of-development approach,
you are able to simplify the questions and deal with recognizable smaller spans of time
within the overall period under study. For instance, this approach is most appropriate for a question such as, "Discuss the course of American foreign policy from 1920 until the present." Here you could break down the period 1920-1966 into the smaller stages of development:

1920-1941: Isolationism
1942-1945: World War II
1945-1947: Years of Indecision

C. The Conclusion of your essay examination can be a time for ramifications upon your thesis, a time for corollaries, or a time for simple reiteration of the points presented in the Introduction and proven in the Body. Whatever it is, the Conclusion will baffle you only if you do not know what you have been writing. In general, the Conclusion need be nothing more than a space in which you say in so many words: "I said such-and-such in the beginning, I have proven with facts the rectitude of my assessment; therefore, what I have contended is correct."
Section 7:
Study Tips for Economics Courses
STUDY TIPS FOR ECONOMICS COURSES

(a condensed summary)

Learning Skills Center-University of Texas at Austin

TAKING NOTES IN CLASS

• Before class: At least pre-skim related readings and review lecture notes from previous class; look at problems in the study guide; make note of new terms, concepts, measures, models, graphs, and theories; formulate questions.
• During class: Have questions in mind as the lecture begins; adapt a format which allows a wide left-hand margin for summarizing and editing your notes, plus a narrow right-hand margin for recording your own insights, questions, etc.; be alert to assumptions underlying hypotheses and note how hypotheses are tested against observable data.
• After class: Review and edit your notes; use the left-hand margin to summarize material and list key terms; “test” yourself as soon as possible to recall lecture highlights.

READING THE TEXT

• Preview the material: Look at the sub-headings, graphs, questions at the end of the chapter; note new terms.
• Read actively: Formulate questions before you read (from lecture notes and preview) and then read to answer those questions; translate abstract concepts to specific instances; know what every term and symbol means.
• Analyze graphs thoroughly: What “economic story” is being told?; what are the assumptions?; note units of measurement on each axis; note direction (positive or negative) of the relationship.
• Recall: Test yourself immediately and cumulatively at the end of each section; then use a combination of marginal notations and underlining to summarize.
• Reflect: Set aside time to question and criticize what you’ve read—then make notes of those thoughts.

PREPARING FOR EXAMS

• Integrate and review lecture and text notes; make a list of key topics, concepts, problems, theories, models, and terms.
• Review via active recall rather than just passive re-reading.
• Re-work homework questions and workbook problems.
• Practice using the information in the form that will be required by the test format; predict test questions and problems and practice answering them.
• Realize that various test questions will ask you to know, comprehend, apply, and analyze what you’ve studied.

TAking EXAMS

• Glance over the whole exam quickly, assessing questions as to their level of difficulty and point value; set time goals for each section accordingly.
• Begin to work the questions which are easiest for you; the others will be easier when you’ve “warmed up”.
• Maximize partial credit possibilities by attempting all questions.
• Save time at the end of the exam for re-reading and editing.
• Analyze returned tests to prepare for future ones.

WORKING WITH GRAPHS IN ECONOMICS

(prepared by Vincent Geraci, Associate Professor of Economics, for the Learning Skills Center, University of Texas at Austin 10/82)

At one of our well-known colleges, students have their own names for all the courses. They call the astronomy course “stars”, the geology course “rocks”, and the biology course “frogs”. Their name for the economics course is “graphs and laughs”. (story by E.G. Dolan)

Well, I don’t know about the laughs, but I’m sure about the graphs. A good picture is worth many (if not a thousand) words, so economists use graphs to illustrate the theories they develop about people’s economic behavior. As an aid to studying economics, we need to master the basics of working with graphs.

We first bearded the “line’s den” in high school when we encountered those two cats, “y” and “x”. We wrote the linear equation:

\[ y = b + mx \]

where “y” is the dependent variable, “x” is the independent variable, “b” is the vertical intercept, and “m” is the slope (sometimes described as “rise over run”), Illustrative graphs follow:

The master of modern video games realizes that we are working in the Cartesian coordinate system with the northeast quadrant reserved for positive thinking (i.e. both axes are positive).

*Economists like to scramble matters a bit (and maybe your mind in the process) by using symbols other than “y” and “x”. For example, consider the basic relationship between household consumption and household income. A simple model of household consumption behavior is the linear function:

\[ C = a + bY \]

where \( a > 0 \), \( 0 < b < 1 \)

where \( C \) is consumption (in dollars), \( Y \) is income (in dollars), \( a \) is autonomous consumption (in dollars), and \( b \) is the marginal propensity to consume (pure number).
Note that the preceding relationship is just the linear equation from before with new actors:

\[ y = b + mx \]

- **y**: dependent variable
- **x**: independent variable
- **b**: intercept
- **m**: slope

\[ C = a + by \]

- **C**: 
- **Y**: 
- **a**: 
- **b**: 

Earlier, "b" denoted the intercept; now "b" denotes the slope. It obviously pays not to become hooked on a particular notation. "To b or not to b; that is the question." (Pardon the sick humor.)

The linear consumption relationship, by its constant slope "b", embodies the special economic assumption that households consume a constant fraction out of each added dollar of income. Also, consumption generally rises with income; hence the slope "b" is positive.

When learning a new graph in economics, first ask yourself the purpose of the graph. What economic story is being told? What are the economic assumptions and the lessons? Be sure to note the **units of measurement** on each axis (dollars for both "C" and "Y") and the **direction** of the relationship (positive for "C" as a function of "Y").

*Of course, household consumption depends on a great many factors besides income, e.g. household size and composition, individual expectations about future prices, and so on. Since these other determinants of consumption do not appear on the graph, the effects of consumption on changes in them are captured by shifts of the entire consumption line. If the change spells increased consumption for any given level of income (e.g. household size increases), then the line shifts to the right. If the change spells decreased consumption, the line shifts to the left.

Shifts must be distinguished from “movements along” a particular consumption line. The latter reflect changes in consumption that are produced by changes in income itself.

* Most economic behavior involves multiple behavioral relationships. The prototype is the simple supply and demand model for an individual commodity in a competitive market. Continuing to assume linear relationships for simplicity, we may posit:

\[ Q^S = a + bP \]

- **Supply**
- **Demand**
- **Equilibrium**

\[ Q^D = c + dP \]

\[ Q^S = Q^D \]

(a>0, b<0) (c>0, d<0)
Here $Q^*$ is quantity supplied, $Q^0$ is quantity demanded, $P$ is price, a and b are respectively the intercept and slope of the supply schedule and c and d are respectively the intercept and (magnitude of the) slope of the demand schedule. Of course, a and b represent different constants here from those of the consumption function. I reused the symbols, a and b, to emphasize that one must avoid memorization of symbols. After all, symbols mean nothing out of particular economic (or other) contexts.

*The market equilibrium (temporary place of rest) may be illustrated as:

![Diagram of supply and demand curves]

The intersection of the supply and demand lines illustrates the market equilibrium ("E") in which quantity supplied equals quantity demanded equals quantity transacted ($Q^S = Q^D = Q_e$) at the equilibrium price $P_e$. For prices above $P_e$ there is excess supply which—assuming competition—will drive the price down. For prices below $P_e$ there is excess demand which will drive the price up. The equilibrium is reached at point E.

* As a final exercise in using graphs, suppose that some determinant of quantity demanded other than price changes; then the demand curve shifts. If the change increases quantity demanded at any given price (e.g. consumer incomes rise), then the demand curve shifts to the right. In this event, both equilibrium price and quantity rise.

![Diagram of demand curve shift]

In learning supply and demand analysis, you should evaluate the effects on price and quantity of various, alternative changes in the economic determinants. Graphs usually prove an invaluable aid.
LEARNING ECONOMICS: IMPOSSIBLE OR IMPOSING

(Jack Mogab and De Johnson, Southwest Texas State University)

QUESTION: Why do many students discover the principles of economics courses as one of the most difficult experiences in their first two years of college?

ANSWER: Because these two introductory courses combine the study of economic models with both analyses and applications of those models. These three aspects of mastering economic theory rely on a basic understanding of the special language of economics.

Since most of you did not study economics in high school, you come to college economics courses without that special language or prior knowledge of general economic theory. Yet you must demonstrate that you can analyze and apply these theories in order to achieve an understanding of economics.

The following examples demonstrate this academic challenge. The first level of academic performance is knowledge—the remembering of previously learned material. Whenever you learn (i.e. remember) specific facts or explanations or definitions, you are functioning at the knowledge level. A test question at this level might be:

QUESTION: To say that two economic goals are mutually exclusive means that: (a) it is not possible to achieve both goals; (b) these goals are not accepted as goals in the U.S.S.R. (c) the achievement of one of the goals results in the achievement of the other, (d) it is possible to quantify both goals.

ANSWER: (a) it is not possible to achieve both goals

or

QUESTION: Profit is the reward paid to those who provide the economy with capital.

ANSWER: False.

This type of question is probably routine for you since knowledge level questions are typically asked on high school tests. But in Economics, only a few (15-20%) of test questions are at this level. Yet it is essential to learn material in this way because you need the knowledge to function at the next level.

Comprehension is the second level of academic performance. It is the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). These learning outcomes go one step beyond the simple remembering of material and represent the lowest level of understanding. Several examples of comprehension questions are:

QUESTION: If an individual determines to save a larger percentage of his/her income, he/she will no doubt be able to save more. To reason, therefore, that if all individuals determine to save a larger percentage of their incomes they will be able to save more is an example of: (a) the post hoc, ergo propter hoc fallacy, (b) the fallacy of composition, (c) a generalization that is true during a depression but untrue during prosperity, (d) using loaded terminology.

ANSWER: (b) the fallacy of composition
QUESTION: If there is an increase in the resources available within the economy: (a) more goods and services will be produced in the economy; (b) the economy will be capable of producing more goods and services; (c) the standard of living in the economy will rise; (d) the technological efficiency of the economy will improve.

ANSWER: (b) the economy will be capable of producing more goods and services.

Comprehension questions comprise 30-40% of most economics tests. (Note: your first test in each course will probably have 50% comprehension questions.)

The third level, application, is the ability to use learned material in new and concrete situations. This may include the application of such things as concepts, principles, laws, and theories. Obviously, to function at this level requires both knowledge and comprehension of the relevant material.

Examples of application questions are:

QUESTION: The law of supply states that as price increases: (a) supply increases; (b) supply decreases; (c) quantity supplied increases; (d) quantity supplied decreases.

ANSWER: (c) quantity supplied increases

Using this table, answer the following question.

<table>
<thead>
<tr>
<th>P</th>
<th>Os (1,000 bu. of wheat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7.00</td>
<td>40 bu.</td>
</tr>
<tr>
<td>$6.00</td>
<td>35 bu.</td>
</tr>
<tr>
<td>$5.00</td>
<td>30 bu.</td>
</tr>
<tr>
<td>$4.00</td>
<td>25 bu.</td>
</tr>
<tr>
<td>$3.00</td>
<td>20 bu.</td>
</tr>
</tbody>
</table>

QUESTION: In the table, if price increases from $5.00 to $6.00, the quantity supplied increases from 30,000 bu. To 35,000 bu. This is an example of: (a) law of demand; (b) an increase in supply; (c) a decrease in demand; (d) law of supply.

ANSWER: (d) law of supply

Using this graph, answer the following question:
QUESTION: In the graph, the upward sloping supply curve represents: (a) law of supply, (b) law of demand; (c) an increase in supply; (d) all of the above.

ANSWER: (a) law of supply

Notice that these three questions are essentially the same question in different formats: verbal, numerical, and graphic.

**Analysis**, the fourth level, is the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationship between parts, and recognition of the organizational principles involved.

The analysis of the relationship between parts of a theory is especially important in the study of economics. Examples of this level of question are:

QUESTION: An increase in demand and a decrease in supply will: (a) increase price and increase the quantity exchanged; (b) decrease price and decrease the quantity exchanged; (c) increase price and the effect upon quantity exchanged will be indeterminate; (d) decrease price and the effect upon quantity exchanged will be indeterminate.

ANSWER: (c) increase price and the effect upon quantity exchanged will be indeterminate.
Section 8:
Special Techniques for Math and Science Courses
SPECIAL TECHNIQUES FOR MATH AND SCIENCE TESTS

Source material unknown.

1. Translate problems into English. Putting problems into words aids your understanding. When you study equations and formulae, put those into words, too. The words help you see a variety of applications for each formula. For example, the Pythagorean Theorem, \( C^2 = A^2 + B^2 \), can be translated as, "The square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides".

2. Perform opposite operations. If a problem involves multiplication, check your work by dividing; add, then subtract; factor, multiply; square root, square; differentiate, integrate.

3. Use time drills. Practice working problems fast. Time yourself. Exchange problems with a friend and time each other. You can also do this in a study group.

4. Analyze before you compute. Set up the problem before you begin to solve it. When a problem is worth a lot of points, read it twice slowly. Analyze it carefully. When you take time to analyze a problem, you can often see ways to take computational short-cuts.

5. Make a picture. Draw a picture or a diagram if you are stuck. Sometimes a visual representation will clear a blocked mind.

6. Estimate first. Estimation is a good way to double-check your work. Doing this first can help you notice if your computations go awry, and then you can correct the error quickly.

7. Check your work systematically. When you check your work, ask yourself: Did I read the problem correctly? Did I use the correct formula or equation? Is my arithmetic correct? Is my answer in the proper form? Avoid the temptation to change an answer in the last few minutes—unless you're sure the answer is wrong. In a last-minute rush to finish the test, it's easier to choose the wrong answer.

8. Review formulae. Right before the test, review any formulae you'll need to use. Then write them out on scratch paper as soon as possible during the test.

MATH STUDY SKILLS

Compiled by Cindy Arem, Ph.D. Math & Sciences Counselor, Pima Community College West Campus

1. If math is difficult for you, audit the course first. You'll get the most from the course if you take notes, do your homework, ask the teacher questions, study for it, and take all the tests. You'll have no pressure of being graded.

2. Before registering for math, research which teacher would be best for you. Ask other students which teachers they liked and why. Visit prospective professors during their office hours; ask about their teaching methods and if you could sit in one session of their course. Be sure to select a teacher who: (a) explains concepts clearly; (b) welcomes questions; (c) willingly helps students outside of class; (d) gives fair tests and (e) provides helpful handouts to complement your class notes.

3. Attend all classes and take full class notes. Research has shown that successful students never cut class and usually take down at least 64% of what is discussed in
class. Failing students write half as much and often miss class. Remember, missing even one class can put you behind in the course by at least 2 classes. Do you know why?

4. Consider attending more than one section of the course. By hearing a difficult concept explained a second time, you may understand it better.

5. Make it a practice to read over the topic or chapter before going to your math class. This will give you a much better understanding of what is being discussed in class, and as a result, you'll learn more from the lecture.

6. Organize your notes into one large spiral or loose-leaf notebook devoted only to math. Use the first half for class notes and the second half for homework. Take a complete set of class notes and add any helpful clarifications to your notes that you hear in class. Mentally follow all explanations and try to understand the concepts and principles. Then write down the main points, steps in explanations, definitions, examples, solutions, or proofs.

7. Date each day's class notes. Write the topic or chapter heading on top of the page. Leave a 2" margin on the left side for comments. Use only one side of a page, leaving the back for additional examples, notes, and clarifications.

8. Label both your notes and your textbook using categories such as: (a) definition of..., (b) theorem..., (c) example or discussion of examples, (d) description of a procedure for solving a problem type, (e) a proof of a theorem or a derivation of a formula, (f) a list of procedure steps, and (g) formulae or equations.

9. It's important to stay current. Do not allow yourself to fall behind, or the entire course will become an effort and a struggle for you.

10. Review immediately after class and again 8 hours later. Fill in all the missing words or incomplete explanations. Recite important concepts in your own words. Research shows that most of the information is lost within the first 20 to 60 minutes after learning. However, if you review immediately after class and again within the same day, and then do weekly and monthly reviews, the information you have learned will remain in long-term memory.

11. Ask questions. Always remember you have the right to ask questions before, during, and after class. Never avoid asking a question out of fear of looking stupid. Don't allow a question to go unanswered. Get help fast.

12. Create questions for yourself when you study and then answer them. Be persistent.

13. When you feel "lost", ask your professor to explain the first step that you did not understand, then question any later steps that you still did not follow. When you can't see the overall picture of what the instructor is doing, ask questions. See your instructor during office hours and visit the math learning center for help. Notice when you are beginning to get into trouble and seek assistance immediately.

14. To get the most benefit from a help session: (a) use question marks to identify confusing material in your notes or textbook; (b) write down specific questions you will ask; (c) afterwards review what you have learned by "saying" and "doing"; (d) ask your instructor or tutor if you could explain to them what you have just learned and if you could demonstrate your new knowledge by doing a problem.
15. Always remember the “say and do” principle. Research shows that we remember only 10% of what we read, 20% of what we see, but a full 90% of what we say and do, so whenever possible, say and do.

16. Work out lots of sample problems. Practice, practice, practice. Do assigned problems and lots more. Make up your own problems. Get sample problems from other books. Work with a classmate and explain aloud what you are learning and how to solve problems. Remember the more you “say and do” the more you will be able to recall what you are learning. You must always be involved in the learning process.

17. The best time to do your homework is the same day that it’s assigned. This will help reinforce what you have just learned. Estimate the right answers before you work the problems out. Substitute your answers back into the problem. Redo the problem in a different way to see if your answer still matches.

18. Read and study all your textbook explanations of each type of problem. Whenever possible, use additional textbooks and study guides as resources. Each book will discuss your topic differently and offer different examples. This is an excellent way to clarify difficult concepts and to give you more practical problems.

19. Work with a review or course outline book that applies to your math course. They provide many worked-out examples and summary collections of problems and answers which are useful for preparing for tests. Always work out a problem first before reading how the author solved it. Examples of course outline books include: Schaum’s, AMSCO, Barron’s, Barnes and Nobles.

20. Identify the different types of problem you are learning. Note the elements of each. By identifying the different types of problems you are more likely to be able to isolate difficult areas in which you need more practice or help.

21. Describe in your own words the similarities and differences between the different types of problems you are learning. Do this aloud with someone else. By understanding the structure of each type of problem, you will be able to select the appropriate method or formula for solving it.

22. Know and understand your math terminology. This is one of the keys to success in any field. Use 3"x5" review cards to study math’s own unique vocabulary. Put the term on one side and the definition on the other. Carry these cards with you everywhere and review them at odd moments throughout the day. You won’t even feel like you’re studying.

23. Never attempt to memorize a formula (or rule, proof, or procedure) until you’ve attempted to understand it first. This understanding will help you recreate a formula (or procedure, etc.) if your recall falters in any way. Make sure you can illustrate the definitions, theorems, and the use of the symbols. You may want to use 3"x5" cards to help you memorize some formulas for convenience and quick recall.

24. Write up summary sheets of math terminology and formulae and review them often.

25. Successful math students study math 2 hours per day at least 5 days per week. In addition, they work out 10 new problems and 5 review problems during each study session.

26. If math is your most difficult subject, make sure to study it before all other subjects. Do not leave it until the end. You must study math when you’re most alert and fresh. It
will go better for you, and you'll recall more. Research also shows that you'll retain more information if you take 5 to 10 minute study breaks every 20 to 40 minutes.

27. Act as if you have control of your level of success in math. Act as if you are really enjoying it. Eventually, your habit of pretending and resulting success will make your feelings match your behavior.

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**Overcoming Math Anxiety**

*VSU Special Services*

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Here are some suggestions to help overcome math anxiety:

**Coping Skills**
- Begin in an appropriate level class. Don't take advanced classes without the proper background.
- Set aside a specific time every day for studying math; just going to class is not enough.
- Get help whenever you need it. Ask your instructor, friends, or get a tutor.
- Face anxiety: Feel it for a few moments then practice relaxation techniques such as deep breathing to calm yourself physically.
- Don't allow “What if...?” questions to take over. Instead say, “I can,” or, “I want to”. This leads to a positive problem solving approach.
- Focus attention away from yourself and back on the problem at hand.
- Practice problems until you are comfortable with them.
- When working on homework or practice tests, keep a diary of your thoughts and feelings. Discuss these with your counselor or tutor.

**Tips for Tests**
- Before you do any problems, read the whole test.
- Do a problem that you feel confident with first.
- Don't cram for tests. Begin reviewing several days in advance to avoid last-minute panic.

**Preparation**
- Begin preparing early. Pay attention during class. Every minute you daydream in class is many more minutes of studying later. Do assigned homework problems. Math is a building process, and in order to understand the next step, you need to comprehend the present and previous ones.
• Simulate test conditions. After you have studied and think you know
the material, practice it under test conditions. Solve unassigned
problems and see if you can finish them in the allotted time for an
exam.

• Know your professor. Study a copy of the exam of a previous class if
available. Talk with someone who has taken the professor’s class
before, preferably someone who has succeeded in the class.

• Form a study group of 3-4 dedicated students. Not only will other
students be able to help you with problems, but by helping others
you will better learn the material. If you are unable to teach another
student a topic you believe you know, chances are you don’t know
that topic very well after all. If you can’t teach it, you don’t know it.

Testing

• Read through the exam. With reading through the whole exam, you
can know what is expected of you, prioritize items on the test, and
pace yourself.

• Carefully read the instructions. Make sure you’re answering the
question that is being asked. Often students know how to solve a
problem, but they misread or misinterpret the question itself.

• Check that you have correctly rewritten the problem. If you use a
scratch piece of paper, make sure that you correctly rewrite the
problem. Don’t skip steps. Start from the beginning.

• Clearly write each step of the solution. Be neat and don’t rush in
writing down numbers.

Getting Ready for your Math Final

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1. BE ABLE TO DO THE HOMEWORK PROBLEMS. You should expect a vast majority of
the exam problems will be of nearly identical difficulty to the assigned homework
problems, lecture examples, textbook examples, review sheets and sample exams. This
is particularly true of problems pertaining to material covered since the last exam, when
the professor rushes to complete the syllabus. At this time, everybody gets lost during
lecture and resorts to copying the board into their notes, rather than listening, and the
professor can’t realistically expect the average student to do much more on the exam
than what a basic working knowledge of the material can deliver.

2. BE ABLE TO DO THE STUFF COVERED IN PREVIOUS EXAMS BETTER THAN IN
THE PAST. Every professor expects students to improve (do problems faster, more
accurately, with greater organization, with more proper use of notation, maybe even in
fewer steps) on problems pertaining to material tested previously. Should you end up in
a borderline grade situation after the final, a quick glance at your final exam will
provide the professor with sufficient evidence to determine whether you’ve become
better at doing what you’ve been asked to do before and are therefore entitled to a more
favorable grade. Professors do not toss a coin, nor do they lower grade cut-offs slightly
simply because some people are a few points short of (your desired grade here). Failing
to improve will lose the game for you.
3. DON'T REFUSE TO STUDY OLD METHODS THAT WERE REPLACED BY OTHER METHODS. Professors love to display their anal tendencies, restricting the creativity and resourcefulness of the student, by wording problems like, "Solve <this equation> using <this method>." Just because we've learned to solve systems of linear equations by Gauss-Jordan elimination and matrix inversion doesn't mean that strong-arm methods like substitution are no longer of value. Following directions and using methods requested will always yield you more points than getting the same right answer by the method of your choice.

4. IF POSSIBLE, OBTAIN A COPY OF (YOUR PROFESSOR'S) FINAL EXAMS FROM PREVIOUS SEMESTERS. Most professor's final exams don't evolve very quickly. There's a good chance that this semester's final is going to be very similar in style, difficulty, and emphasis of topics to previous finals. Warning: Make sure that the basic construct of the course (text, syllabus, calculator methods) has not changed significantly since the old exam was applied.

5. KEEP YOUR EYES AND EARS OPEN. Listen for key words in lectures, such as, "important", "vital", or any indication that the professor thinks that a particular type of problem, solution technique, theorem, concept, or insight should be kept mentally handy. This should put up the big this-is-going-to-be-on-the-final flag. Visit the professor/TA and ask for help on how to do a particular problem (make a valid, written attempt at solving the problem on your own first, and bring the work with you). You'll probably get big hints regarding recommended methods, as well as a spelled-out demonstration of the logic and motivation underlying the solution that will emphasize what the professor wants you to have readily available at the exam.

6. STUDY BY RECITING AND REWRITING. You'll begin to hear voices and see things during the final exam, and not just because of your poor eating/sleeping habits. Often, much of a person's memory is visual and aural. When you stare at the heavens to remember something during your exam, you'll be attempting to recall what you heard and saw when you learned it. Recollections of repetitions of your own voice and writing are going to be more firmly fixed in your mind than the few repetitions by your instructors and text. Don't just read your study material—actually verbalize it (using precise nouns and verbs—not "do this to that") and rewrite it many times so the sounds and shapes are easily recalled. Furthermore, the feel of writing can also be memorized, providing you with less self-doubt while writing the exam. For example, how many times have you had to write a word and see if it looks right in order to convince yourself that you've spelled it right? Study in groups, making sure you speak and write precisely and boldly criticize your own work as well as the work of others.

7. MAKE YOUR OWN SAMPLE EXAM. Don't assume that plowing through the review sheet and sample exam will be enough practice. Cut problems out of Xeroxes of your homework, quizzes, textbook, review sheets and previous exam and assemble them into an exam-like thing. If possible, remove hints about which chapter/section of the text/course they pertain to by cutting close to the problems and mixing them up. After all, the final exam will very likely be similarly devoid of temporal clues. When working on this exam, make note of the "stupid" mistakes you tend to make. Becoming aware of the accidents you are likely to execute is the first step towards safeguarding against them.

Here's a method of taking the sample exam that may point out your strengths and weaknesses to you, as well as get you the most points out of your final.

First, concentrate on classifying the problem by identifying key symbols and phrases in the text of the problem according to what techniques or theorems you would use to
solve it, and make notes in the margins; also note how difficult you assess the problem to be.

Second, go through the exam and for each of the classifications made in the first step, solve the really easy problems and then the not so easy problems. What you’ll be doing is warming up for the harder problems in each classification without constantly changing gears from one problem to the next, thus building momentum. Don’t be afraid to make notes regarding where and why you got stuck on a problem. You may be reclassifying the problem, giving yourself the opportunity to get further through it as you do the problem of this new classification.

Third, go through the exam and check your solutions for accuracy (any arithmetic errors?) and attempt to get a little further along on your partial solutions using the total wealth of knowledge that you’ve conjured up in the second step (this is particularly helpful in completing the harder concept-synthesizing problems).

Although the first step devotes time to examining problems without attempting to solve them, this time could be easily made up in the second step. Additionally, you’ll be providing a narrative of your proposed solution technique for the grader, making it easy for the partial credit gods to smile upon any partial solutions you may have.

The Ten Commandments of Mathematics

By: Dr. Anthony Trippe, ITT Technical Institute, San Diego, CA

1. Remember the Order of Operations: Parenthesis, Exponentiation, Multiplication and Division, Addition and Subtraction, from left to right. First (a+b), Second (a²), Third a*b or a/b, and Fourth a=b

2. Multiplying fractions is very easy. Simply multiply both numerators and both denominators to obtain the numerator and denominator for the product fraction.
(a/b) × (c/d) = (ac/bd)

3. Dividing fractions is easy. Simply invert the denominator fraction and multiply.
(a/b) ÷ (c/d) = (a/b) × (d/c) = (ad/bc)

4. Adding and subtracting fractions requires a common denominator.
(a/b) + or - (c/d) = (ad/bd) + or - (ad + or - cb/bd)

5. If you multiply or divide both the numerator and denominator of a fraction by the same amount, you do not change the value of the fraction (the ratio).
(a/b) × (a/b)(c/c) = (ac/bc)

6. If you do the same operation to the left side and the right side of an equation, you do not change the value of the equality.
a + b = c is equal to 3(a + b) = 3c (multiply both sides by 3)

7. A base with a negative exponent can be changed to the same base with a positive exponent by moving the base and its exponent either from the numerator to the denominator or from the denominator to the numerator.
a⁻ⁿ = 1/aⁿ
8. Multiplying two powers with the same base is done by adding the exponents.
\[(a^n)(a^m) = a^{n+m}\]

9. Dividing two powers with the same base is done by subtracting the exponents.
\[a^n/a^m = a^{n-m}\]

10. Thou shalt never divide by zero!
    \[a/0 = \text{BAD (indeterminate)}\]