Central Carolina Community College

CPT Placement Test Review Booklet

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Disclaimer: This booklet serves as practice for the CPT exam, and it may not include every rule found on the CPT exam.
Sentence Skills Review

The CPT sentence skills test measures students' editing skills. The minimum required score for this exam is 86%.

This booklet gives students the opportunity to review some basic grammar rules and provides some practice for the CPT test. It does not include every rule found on the CPT exam. Some other helpful tools that will allow you to practice editing sentences are GED and SAT books.

**Subject/Verb Agreement**
Singular subjects need singular verbs, and plural subjects need plural verbs because both must agree in number. Singular verbs in the present tense end in "s" or "es." Usually in English the subject comes first and then the verb, but in many direct questions and when "here" or "there" begins the sentence, the verb comes first in the sentence. Prepositional phrases that follow the subject can be troublesome for students. Nothing in the prepositional phrase can be the subject of the sentence. Always eliminate prepositional phrases first, and then find the subject and verb.

**Examples:**
Everyone in our company (plans, plan) to go to the company picnic on Saturday.  
Delete the prepositional phrase “in our company.” Find the subject “Everyone,” which is singular.  
Choose the singular verb “plans” to agree with the singular subject.

Here (is, are) the announcers for the local charity benefit taking place today.  
(“Announcers” is the subject; choose the plural verb “are” to agree in number with the plural subject “announcers.” “Here” is never a subject.

**Modifiers**
Dangling modifiers do not have anything to describe—they just dangle in sentences. If a modifier has nothing to modify (a dangling modifier), add or change words so that it has something to modify. If a modifier is in the wrong place (a misplaced modifier), put it as close as possible to the word, phrase, or clause it modifies.

**Examples:**
(1) Hanging from the ledge high over a mountain, Danielle saw the trees with their brightly colored fall leaves.  
(Danielle is not hanging over the mountain—the trees are.)  
Rewritten:  
Danielle saw the trees with their brightly colored fall leaves hanging from the ledge high over a mountain.

(2) Studying for a test, the baby finally went to sleep.  
(As worded, this sentence suggests that the baby is studying. Words need to be added to correct this dangling modifier.)  
Rewritten:  
Studying for a test, Molly was happy that her baby finally went to sleep.
**Sentence Fragments**

A fragment is a phrase or a dependent clause that is punctuated as if it is a complete sentence, beginning with a capital letter and ending with a period. A complete sentence must have a subject and a verb and express a complete thought. A fragment is missing one or both of these. Fragments are not necessarily short. So just because a group of words is long, do not assume that it is a complete sentence. Make sure it has both a subject and a verb and expresses a complete thought.

**Examples:**

(1) The ball over the fence.
   *(This group of words is missing a verb.)*
   **Rewritten:**
   The ball went over the fence.

(2) Mary baking a cake from scratch.
   *(The ing-form of bake, baking, needs a helping verb in order to make the idea complete; therefore, the verb in this sentence is incomplete.)*
   **Rewritten:**
   Mary is baking a cake from scratch.

(3) Because Jane likes ice cream.
   *(The subordinating conjunction “because” makes this group of words an incomplete thought.)*
   **Rewritten:**
   Jane likes ice cream.

**Comma Splice**

A comma splice occurs when two complete sentences have a comma between them. A comma is not strong enough to stand alone as sufficient punctuation between two complete sentences *(a complete sentence contains both a subject and a verb and expresses a complete thought).* There are four basic ways to correct a comma splice:

1. Put a period between the two complete sentences, making sure that the first letter of each complete sentence is capitalized.
2. Use a comma **PLUS** an appropriate coordinating conjunction, such as **for, and, nor, but, or, yet, or so** between the two sentences.
3. Use a subordinating conjunction, such as **when, while, after, unless, even if, etc.** to turn either the first part or the second part into a dependent clause. If the dependent clause is the first part, put a comma after the **entire** dependent clause. If the dependent clause is in the second part, no comma is needed.
4. Use a semicolon between the two complete sentences. This is especially effective if the two sentences are closely related.

**Examples:**

(1) The test was on Monday, she spent her whole weekend studying for it.
   **Rewritten:** The test was on Monday. She spent her whole weekend studying for it.
   *(A period was placed at the end of the first sentence.)*

(2) Cindy wants to be a teacher, she does not want to spend four years in college.
   **Rewritten:**
   Cindy wants to be a teacher, but she does not want to spend four years in college.
(This was rewritten with a comma plus an appropriate coordinating conjunction.)

(3) Mark was angry that his little brother spilled the drink, he helped him clean it up.
Rewritten:
Even though Mark was angry that his little brother spilled the drink, he helped him clean it up.
(This was rewritten with a subordinating conjunction at the beginning.)

(4) My answer is simple, I will not go.
Rewritten:
My answer is simple; I will not go.
(Now a semicolon is used to fix the comma splice.)

**Coordination**
Coordination is used to join two closely related sentences that are equal in importance. One way to join two closely related sentences is to put a semicolon between them. Another way is to use a comma and a coordinating conjunction between the two sentences. The seven coordinating conjunctions are for, and, nor, but, or, yet, and so.

**Examples:**
(1) Harold felt pressured to score. His team was just one point away from victory.
Rewritten:
Harold felt pressured to score; his team was just one point away from victory.
(This was rewritten using a semicolon between the complete sentences)

(2) Barbara wanted to make her friend's birthday party special. She ordered balloons.
Rewritten: Barbara wanted to make her friend's birthday party special, so she ordered balloons.
(This was rewritten using a comma and a coordinating conjunction.)

**Semicolon**
The semicolon is used to separate two complete sentences. This may be accomplished simply by placing a semicolon between the two complete sentences or by using a semicolon plus a conjunctive adverb and a comma. The conjunctive adverb is used to make the relationship between the two sentences clearer.

*Below is a list of some common conjunctive adverbs and their meanings.*
- **Addition:** in addition, also, besides, furthermore, likewise, moreover
- **Alternative:** instead, otherwise
- **Contrast:** however, nevertheless, nonetheless
- **Emphasis:** indeed, in fact
- **Result:** accordingly, consequently, hence, therefore, thus
- **Time:** meanwhile

**Examples:**
(1) Susie ate the apple instead of the piece of cake. She wanted to lose weight.
Rewritten:
Susie ate the apple instead of the piece of cake; she wanted to lose weight.
(This was rewritten by simply placing a semicolon between the two complete sentences)
(2) Frank finished his exam early. He had time to look over it before handing it in.
Rewritten:
Frank finished his exam early; therefore, he had time to look over it.
(This was rewritten by using a semicolon plus a conjunctive adverb)

**Subordination**
Subordination is used when a writer wants to join two closely related ideas but want to emphasize one point more than the other. In order to make one idea less important than another, a subordinating conjunction is used. A subordinating conjunction makes a sentence incomplete and therefore dependent on a complete sentence to finish the idea.

Example:
Bob hit the ball.
(This is a complete sentence; however, if “although” is added in front of “Bob hit the ball,” the idea is no longer complete. The addition of the subordinating conjunction “although” makes the once complete sentence now dependent on something else to complete it.)

Remember: When the dependent clause comes in the beginning of the combined sentence, a comma is used after the entire dependent clause to set it apart from the complete thought. When the dependent clause comes in the second part of the combined sentence, no comma is necessary.

Several common subordinating conjunctions and the relationships that they show are listed below:

- **Time:** when, whenever, while, as, after
- **Reason or cause:** because, since
- **Purpose:** in order that, so that, that
- **Condition:** even if, unless, if
- **Contrast:** although, even though, whereas
- **Location:** where, wherever
- **Choice:** rather than

Examples:
(1) The teacher told the class to be quiet. The principal made an announcement over the intercom.
Rewritten:
The teacher told the class to be quiet whenever the principal made an announcement over the intercom.
(The subordinating conjunction “whenever” emphasizes the time that the teacher told the class to be quiet. Notice that the subordinate or dependent clause is in the second half of this combined sentence, so no comma is needed.)

(2) Her mother sang a lullaby. The baby fell asleep.
Rewritten:
Because her mother sang a lullaby, the baby fell asleep.
(The subordinating conjunction “because” lets the reader know the reason why the baby fell asleep. Notice that the subordinate or dependent clause is in the first half of this combined sentence, so a comma is used.)
**Parallelism**
Parallelism is used to make all ideas in a sentence parallel or equal in structure. In other words, the same grammatical form is used for each idea. Each idea may be a noun, a verb in the same tense, an adjective, a prepositional phrase, etc. Parallel sentences are much smoother and easier to read than nonparallel sentences.

**Examples:**
(1) Paul washed the car, groomed the dog, and was mowing the lawn all in the same day.
**Rewritten:**
Paul washed the car, groomed the dog, and mowed the lawn all in the same day.
*(This sentence is parallel: each verb is in the past tense form. It is much easier to read.)*

(2) Sarah wanted to study accounting, draw some pictures, and look into becoming a nurse while she was in college.
**Rewritten:**
Sarah wanted to study accounting, art, and nursing while she was in college.
*(This sentence is parallel: the simple noun form of each college subject is used. It is much easier to read.)*

**Making Complete and Logical Comparisons**
When making comparisons in writing, make sure that they are complete and logical. Sometimes when we talk, the way that we compare things or ideas can be incomplete because the listener may already know the surrounding situation or context of the comparison. In writing, however, the reader may not have such context, so you will want to be clear in your comparisons. Also, when using pronouns such as I/me, she/her, he/him, we/us, and they/them, it is important to choose the one that completes your comparison logically and accurately.

**Examples:**
(1) Jim appreciates Monday night football more than his wife.
*(Does Jim appreciate Monday night football more than he does his wife or more than his wife appreciates Monday night football?)*

**Rewritten:**
Jim appreciates Monday night football more than he does his wife.
*(This is one idea that the writer could mean)*

**OR**
Jim appreciates Monday night football more than his wife does.
*(This is another idea that the writer could mean.)*

(2) Barbara likes ice cream more than me.
*(Does Barbara like ice cream more than she likes me or does she like ice cream more than I do?)*

**Rewritten:**
Barbara likes ice cream more than she likes me.
*(This is one idea that the writer could mean.)*

**OR**
Barbara likes ice cream more than I do.
*(This is another idea that the writer could mean.)*
**Avoid Wordy Phrasing**
Avoiding wordy phrasing will make your writing much clearer. First, avoid wordy phrases when you can use one word to mean the same thing. Some common examples of wordy phrases include: due to the fact that, at this point in time, in this day and age, in the event that, on account of the fact that, it is evident from the fact that, etc. Second, avoid redundant phrases. Redundant phrases are phrases in which the same idea is repeated. Some common examples of redundant phrases are: clear and distinct, true-to-life realism, smart and intelligent, cleverly skillful, genuinely authentic, the field of mathematics, the science of physics, the art of ceramics, etc. Usually, only one word out of these phrases will be enough to say what you mean.

**Examples:**
(1) At this point in time, I would like to introduce our speaker.

**Rewritten:**
Now, I would like to introduce our speaker.
*(Now gets across the same idea as at this point in time much more directly.)*

(2) Mark gave Mary a genuinely authentic diamond to celebrate their engagement.

**Rewritten:**
Mark gave Mary a genuine diamond to celebrate their engagement.
*(Since genuine and authentic mean the same thing, only one of these words is necessary.)*

**Verb Tense Sequence**
Verb tense lets us know when an action happened or will happen. When using more than one verb in a sentence, it is important to choose the right combination of tenses to get across the idea that you mean. Below are some guidelines to help you:

**To Indicate Two Simultaneous Actions**

If the main clause is in the simple present tense, use the simple present tense in the subordinate clause:

Mike never works late because he values time with his family.

If the main clause is in the future tense, use the present tense in the subordinate clause:

Mike will continue to come home on time if he values time with his family.

**To Indicate an Earlier Action**

If the main clause is in the simple present tense, use the past tense in the subordinate clause:

Dana believes that Marion broke her new watch.
If the main clause is in the past tense, use past perfect tense in the subordinate clause:

Dana refused to let Marion borrow anything else because she had broken her new watch.

If the main clause is in the future tense, use past tense in the subordinate clause:
Dana’s anger will increase because Marion also tore her blouse.

To Indicate Action That Will Come in the Future

If the main clause is in the present tense, use the future tense in the subordinate clause:

David hopes to pass his biology exam because tomorrow his parents will be ready to take him to his college interview.

If the main clause is in the future perfect tense, use the simple present or present perfect tense in the subordinate clause:

David will have made all A’s in high school when he applies to colleges.

OR

David will have made all A’s in high school before he has applied to colleges.
Sentence Skills Practice Test

This test measures your knowledge of sentence structure—of the ways parts of a sentence are put together and of what makes a sentence complete and clear. There are two sections to the test. Be sure to read the directions carefully for each section.

Section I.

Directions: Select the best version of the underlined part of the sentence. Choice (A) is the same as the original sentence. If you think the original sentence is the best, choose answer (A).

1. To shop, dancing, and swimming are sixteen-year-old Isabella’s hobbies.
   A. To shop, dancing, and swimming
   B. Shopping, dancing, and swimming
   C. To shop, to dance, and swimming
   D. To shop, to dance, and also swimming

2. Hanging sideways, the picture looked as if it would fall off the wall.
   A. Hanging sideways, the picture looked
   B. The picture was hanging sideways, looked
   C. Hanging sideways, I looked
   D. The picture, hanging sideways, looked

3. The student was obviously getting nervous about the test, then Ariel did what he could to calm the student.
   A. test, then Ariel did
   B. test, Ariel did
   C. test; Ariel, therefore, did
   D. test; Ariel, trying to do

4. After Alexis heard that her teacher was leaving, she wrote a poem.
   A. After Alexis heard that her teacher was leaving, she wrote a poem.
   B. After Alexis heard that her teacher was leaving she wrote a poem.
   C. Hearing that Alexis’ teacher was leaving, a poem was written by Alexis.
   D. Alexis heard that her teacher was leaving, she wrote a poem.

5. Driving home, Athena’s favorite song was listened to by her.
   A. Driving home, Athena’s favorite song was listened to by her.
   B. Listening to her song, the radio played Athena’s favorite song.
   C. Driving home, Athena listened to her favorite song on the radio.
   D. Listening to Athena’s song, it played all the way home.
6. When she took the mechanic's class, she learned how to change a flat tire, however, when she actually had a flat tire, she was unable to change it.
   A. a flat tire, however, when
   B. a flat tire, when
   C. a flat tire; when
   D. a flat tire; and when

Section II
Directions: Rewrite each sentence on paper or in your head. Your new sentence should have essentially the same meaning as the original sentence given to you.

7. Raphael heard no animal sounds when he listened in the woods.

Rewrite beginning with
   Listening in the woods, . . .

The next words will be

   A. no animal sounds could be heard.
   B. then Raphael heard no animal sounds.
   C. and hearing no animal sounds.
   D. Raphael heard no animal sounds.

8. When a student is learning how to write a paper, the textbook can be a valuable resource.

Rewrite beginning with
   The textbook is a valuable resource . . .

The next words will be

   A. when you write a paper.
   B. learning how to write a paper.
   C. for students, when they are learning how to write a paper.
   D. when a student is learning how to write a paper.

9. Although the maiden waited patiently, the handsome prince galloped away on his horse.

Rewrite beginning with

   Although the handsome prince . . .

The next words will be . . .
   (A) galloped away on his horse, the maiden waited patiently until he returned.
   (B) galloped away on his horse, and the maiden waited patiently until he returned.
   (C) galloping away on his horse, the maiden waited patiently until he returned.
(D) galloped away, on his horse, the maiden waited patiently until he returned.

10. Students must be able to write good English papers, so many students must take a developmental English class.

Rewrite beginning with
Because students must be able . . .

The next words will be
(A) to write good English papers; therefore, many students must take a developmental English class.
(B) to write good English papers, many students must take a developmental English class.
(C) to write good English papers, and many students must take a developmental English class.
(D) to write good English papers, so that many students must take a developmental English class.

11. Reviewing for a test is not always easy nor is it easy to repeat a class.
Rewrite beginning with
While reviewing for a test is . . .

The next words will be
(A) not always easy; it is not fun to repeat a class either.
(B) not always easy, it is not easy to repeat a class either.
(C) not always easy it is not easy to repeat a class either.
(D) not always easy, and it is not fun to repeat a class either.

12. The temperature in the desert was soaring in the hot afternoon heat, but the lizards seemed to enjoy the sun.
Rewrite beginning with

Even though the temperature in the desert was soaring . . .

The next words will be . . .

(A) in the hot afternoon heat, and the lizards seemed to enjoy the sun.
(B) in the hot afternoon heat the lizards seemed to enjoy the sun.
(C) in the hot afternoon heat, the lizards seemed to enjoy the sun.
(D) the lizards, in the hot afternoon heat, seemed to enjoy the sun.

13. We had to change our plans. We could not take our cruise until the end of the month.

Rewrite beginning with

We could not take our cruise until the end of the . . .
The next words will be
(A) month, because we had to change our plans.
(B) month, so we had to change our plans.
(C) month, we had to change our plans.
(D) month, then we had to change our plans.

14. George felt that his hypnotic sessions should have a strong receptive audience, and, because of that, he invited only people with a true interest in hypnosis.

Rewrite beginning with
George’s invitations were

Your new sentence **will include**
(A) the effect was that
(B) it resulted from
(C) since he felt
(D) it resulted from

15. Michael was a devoted and loving husband who wanted to keep his marriage together, but he had a mistress and decided to end the affair so that he could keep his marriage together.

Rewrite beginning with
Michael had a mistress . . .

Your new sentence **will include**
(A) wanting to keep his marriage together
(B) because he was a devoted
(C) then he was a devoted
(D) so devoting

These practice questions serve as practice only. They do not cover every rule found on the CPT exam; therefore, don’t spend your time just studying these practice questions.
Sentence Skills Answer Key

1. Correct answer: B
   Primary skill tested: faulty parallelism
2. Correct answer: A
   Primary skill tested: -ing modifiers
3. Correct answer: C
   Primary skill tested: semicolon usage
4. Correct answer: A
   Primary skill tested: using effective subordination
   Secondary skills tested: -ing modifiers, comma splices
5. Correct answer: C
   Primary skill tested: -ing modifiers
6. Correct answer: C
   Primary skill tested: semicolon usage
   Secondary skill tested: effective subordination
7. Correct answer: D
   Primary skill tested: -ing modifiers
   Secondary skill tested: recognizing a complete sentence
8. Correct answer: D
   Primary skill tested: using effective subordination
   Secondary skill tested: pronoun reference
9. Correct answer: A
   Primary skill tested: using effective subordination
   Secondary skills tested: coordination, comma usage
10. Correct answer: B
    Primary skill tested: using effective subordination
    Secondary skills tested: coordination, comma usage
11. Correct answer: B
    Primary skill tested: using effective subordination
    Secondary skill tested: coordination
12. Correct answer: C
    Primary skill tested: using effective subordination
    Secondary skills tested: coordination, comma usage
13. Correct answer: B
    Primary skill tested: using effective coordination
    Secondary skill tested: recognizing run-ons
14. Correct answer: C
    Primary skill tested: subordination
15. Correct answer: B
    Primary skill tested: subordination
Reading Review

Finding the Stated or Implied Main Idea

In order to find the main idea of a passage, first determine the subject or topic of the passage. To do this, simply ask yourself “What is this passage about?” Usually your answer to this question will be the subject that is most often mentioned or referred to in the passage. Once you have determined the topic, then ask yourself “What point is being made about that topic?” to get the main idea. For example, your answer to the question “What is this passage about?” might be “crickets” (note that this is a general answer, but more focused than “insects”). Then, your answer to the second question might be “In China, crickets are highly valued” (note that this answer contains a general point about crickets which more specific details in the passage, such as “Crickets are considered to be a symbol of good luck” and “Some Chinese families even have crickets as pets,” might support).

Sometimes the main idea may be stated in a sentence, which may appear anywhere in the passage. At other times, the main idea is not stated in a sentence, but is implied through the details and examples in the passage. In either case, asking yourself “What is this passage about?” and “What point is being made about that topic?” can help you focus on the main idea.

Questions asking you to determine the main idea may be worded in some of the following ways:

1. The main idea of the passage is
2. The author’s main point is
3. The central or controlling idea is
4. The author implies
5. The passage suggests
6. The main point of the selection is

Let’s try an example:
In the coastal region of the state of North Carolina, the waves of the Atlantic Ocean lap the shoreline from the border with Virginia to those of South Carolina. With forts, museums, and lighthouses prominent to the area, there is much to see and do. Many people revisit the Outer Banks year after year, taking time to check out the activities at Jockey’s Ridge, Kitty Hawk, and the drama, The Lost Colony. Youngsters of all ages enjoy the ferry rides that are provided from island to island. Some of the many specific areas to consider when visiting the Coastal Region of North Carolina are presented in this section.
The central idea of this passage is that

a. The coastal region of North Carolina has many forts, sounds, museums, and lighthouses. This is stated in the passage, but the passage has many more examples, so this doesn’t cover what the entire passage is about.

b. The coastal region of North Carolina offers much for visitors to see and do. This covers the examples in the entire passage and is the correct answer.

c. The coastal region of North Carolina is the state’s most popular vacation spot. Positive things are mentioned about the area, but there is not enough information to support that it is the state’s most popular vacation spot.

d. The coastal region of North Carolina is on the Atlantic Ocean. We can tell that this is true according to the passage, but the passage is about much more than this one fact, so this doesn’t cover what the entire passage is about.

**Determining Sentence Relationships**

Being able to see the relationships between sentences is a passage is an important part of being able to comprehend the passage. Often writers will put in transitional words or phrases to indicate a relationship. For example, a writer might use the phrase “in contrast” or the word “however” to indicate a contrast or a different idea, or “for example” to indicate that an illustration or an example is coming next. Sometimes, however, authors do not provide such clues, but it is still important to see the relationship. One trick is to mentally insert a transitional word or phrase between the sentences to see if that makes sense. And, on a test, if you are simply given two sentences, try to imagine them within the context of a paragraph before trying to insert a word or phrase. Ask yourself, “What would this passage be about?” and “What point does the author seem to be trying to make?” Below are some of the most common types of relationships and some of the transitional words that serve to indicate them:

**Example (indicates that the author is providing an example):** for example, for instance, to illustrate

**Additional information (indicates that the author is adding information to the idea just discussed):** and, too, also, additionally, moreover

**Contrast (indicates differences between two things, people, or ideas):** but, however, yet, on the other hand, whereas

**Comparison (Indicates similarities between two things, people, or ideas):** similarly, like, the same as, just as, in a like manner

**Cause and effect (indicates a cause and a result):** because, for this reason, since, as a result, consequently, so

**Time order (indicates when something happened in relation to something else):** first, second, next, then, finally, before, after

When you are being asked to determine the relationships between two sentences, you will see two sentences and be asked to determine the relationship between them. Questions may be worded in the following ways:

1. What is the relationship between the two sentences?
2. How are the two sentences related?
3. What is the relationship of the first sentence to the second sentence?
4. What is the relationship of the second sentence to the first sentence?

Let’s try an example:

**Grammar skills are emphasized because they are helpful outside of the classroom.**

**Secretaries must be able to proofread and check all letters that go out of an office.**

a. **The second sentence provides an example to support what is stated in the first sentence.** If business managers must write coherent and easy-to-read memos, then this is an example of how grammar skills can be useful outside of a classroom setting. Also, the phrase “for example” makes sense placed between the two sentences. This is the correct answer.

b. **The second sentence gives an effect of the cause stated in the first sentence.** The first sentence does not state a cause of anything and a phrase signaling an effect, such as “as a result” does not really make sense between the two sentences.

c. **The second sentence provides an idea that contrasts with the idea stated in the first sentence.** The second sentence indicates that grammar skills must be useful to business managers, so the idea is not in contrast to the idea of the first sentence. A contrast word, like however, does not fit between the two sentences.

d. **The second sentence gives a cause for the effect stated in the first sentence.** The fact that business managers must write coherent memos is not a cause for grammar skills being useful outside of the classroom, it merely supports the fact that they are. Also, a word indicating a causal relationship, such as “because” does not fit between the two sentences.

**Finding Inferences and Drawing Conclusions**

An inference is a conclusion that is not directly stated by the author, but one that the reader may draw based on information given in the passage. This information consists of supporting details. Supporting details are specific pieces of information that combine to clarify, support, or develop a main idea or point, whether that main idea is stated in a topic sentence or is implied. When there is no topic sentence, we must infer, or state in our own words what this idea is. We sometimes call this “reading between the lines”. When we make inferences, we may be inferring the main idea of the passage as a whole, or an important point from the passage that is shown through details. Especially in literature such as novels, short stories, and poems, an author may show with details and word choice rather than just telling the information.

In order to make an inference you must use:

1. Clues provided by the author’s choice of details and words.
2. Your own background knowledge and personal experience as they apply to the clues.
3. Common sense and logic.
Questions asking you to make an inference may be worded in some of the following ways:

1. This passage suggests
2. You can infer from this passage that
3. The author implies that
4. The writer of the passage probably feels, thinks, agrees, etc.
5. Or you may simply be asked to draw a general conclusion based on details in the passage.

*Remember that a conclusion is a general statement that you infer about the passage as a whole based on details in the passage, and inferences may be about any point in the passage.

Let's try an example:

If you get a cat to come to the sound of a can-opener because the cat anticipates a bite of tuna, you are on your way. You then begin to call the cat by name at the same time. Over time you discontinue the can-opener sound and just call the cat while still rewarding with a bite of tuna. Eventually, you discontinue the tuna. However, it is suggested that you provide periodic treats to reinforce the behavior. After all, cats sometimes become impatient with people who aren’t with “their” plan of how life should be.

We may conclude from this passage that

a. **Dogs would never respond to a bite of tuna.** There is no information in the passage about dogs, so this conclusion would be too big of a “leap” from the information presented. Also, those who have dogs know that they enjoy fish, too.

b. **Cats can be trained to behave in a mannerly fashion.** This is too general a conclusion to draw from the example given. We cannot tell from the passage whether or not this type of obedience would extend to other behaviors.

c. **Cats can be trained to come when called.** The example described involves calling the cat’s name and the cat coming to the caller. This is the correct answer.

d. **Cats will only come if you have food with which to reward them.** We cannot conclude this because the passage also suggests discontinuing the can opener sound and the tuna.

**Determining the Author’s Tone**

The tone of a passage reflects the author’s attitude toward or beliefs about the subject. The tone of a passage can be positive or negative, and it can also be neutral, as when the author is simply presenting information. Tone is reflected in the information the author wishes to include, the points he or she chooses to emphasize, and in the words he or she chooses. Keep in mind that you are being asked about the author’s attitude toward the subject, not yours.
Let's try an example:

Anyone who goes into the teaching profession today is either crazy or a saint. Teachers today not only have to see to it that their students learn academic material, but they must keep current with new ideas within their profession and deal with tons of administrative paperwork on top of grading papers. They also must often counsel students and guide their decisions. And their salaries are usually not much above the poverty level. If our society values the education of our young people, teachers should be given more respect and rewards for their efforts.

The author's tone is

a. **admiring.** Clearly, the author admires teachers, but the focus of the passage is that teachers are not rewarded enough for what they do.
b. **begrudging.** The author is not speaking about his or her own life, so therefore cannot be “holding a grudge” against anyone.
c. **neutral.** The author clearly is including his or her opinions and feelings, so he or she is not just presenting information the way a textbook would.
d. **indignant.** Indignant means angry or upset, and clearly the author is upset that teachers are not rewarded more, expressed particularly in the phrase “…either crazy or a saint” and in the phrase “…not much above the poverty level”. This is the correct answer.

The author would disagree with which of the following statements?

a. **Teachers make enough money.** Yes, the author would disagree with this statement. Salary is even mentioned in the passage. This is the correct answer.
b. **Teachers' jobs are very difficult.** The author would agree with this statement. What they have to do is mentioned.
c. **Society takes teachers for granted.** The author would agree with this statement. Being more appreciative of teachers is mentioned.
d. **Teachers need a raise.** The author would agree with this statement. Salary is mentioned as being low.
Reading Practice Test

1. Did you know that the surface of water is elastic? When you venture deep into the Amazon Jungle, you may encounter a lizard-like creature that runs across the top of the water. He does not swim the water; he runs it, like it is a solid surface. It is amazing to see! The combination of his light weight, the speed at which he runs, and the surface of the water giving slightly he maintains his precarious balance on top of the water.

Identify the statement below that gives the most accurate statement of the central idea of this passage.

a. Lizards in the Amazon Jungle are different from those in America.
b. Elasticity of the water’s surface is one component of the lizard’s ability to run on water.
c. All lizards are able to run on water, if it has elasticity.
d. Water in the Amazon Jungle has elasticity because of the hot climate.

2. Bob wondered what career he should choose. He equated making lots of money with success, yet he wanted to be happy in his work and feel that he was contributing something to society. What was his vocation? He considered being a physical therapist, but then thought the life of a psychologist might be interesting. Could he be a mortician? Maybe he would be a microbiologist and find a cure for a terrible disease. He knew one thing: he did not want a clerical job in which he would be taking dictation or preparing transcripts of information. Perhaps he would be a truck driver and transport products for companies across the country. Which one was the most credible as a career for him? These thoughts prompted Bob to make a list of his interests and abilities.

The main idea of this passage is

a. Bob is having a mid-life crisis.
b. Making a list of your interests and abilities is a good way to choose a career.
c. There are many career options open to everyone today.
d. Bob wants to make money, but he also wants to feel satisfied in his work and help his fellow man.

3. Certain aspects must be in place to have a successful basketball team. Talented players are a must. Those athletes with agility, poise, endurance, and strength are integral. Good coaching is necessary to bring the team together with common purpose. Certain discipline is required for the team to function as a well-oiled machine. Offense is an integral part of the game. Shots going in the basket are what scores points and the team with the most of those wins! Three point perimeter shooters can win a game in a clutch last-second play when you’re down by two. However, those players who create and recognize openings are critical to building the score with higher percentage shots near the rim. Reliable free-throw shooters can make
the difference down the stretch and can be the difference in maintaining a lead or losing it in the end.
A good coach will recruit a variety of players adept in the various types of offensive maneuvers. He will then create and teach plays that allow for fluid movement of the offense to create open shots on the basket. Having a well-executed play that results in points on the scoreboard is both beautiful and critical.
Defense is often the key to winning. By denying your opponent the very things you seek on offense, you can secure a win. Good defensive players are those who anticipate passes by being ready to spring into a passing lane at a moment’s notice and steal the ball. This often results in a quick two points on the other end of the court. Good defenders also stick with their opponent on defense. The job is to guard your man totally. That means he doesn’t get the ball and if he does, he does not get an open shot. In zone defenses, you will do the same for any player who comes into your area. A good coach will establish defenses based on the opponent’s offensive preference and will switch defenses throughout a game to find the one that works best.

The main idea of this passage is that

a. With sound offense and defense, and the heart of a winner, a basketball team can emerge victorious.
b. Basketball is a complicated game to watch.
c. Good coaching is a critical element in developing a good basketball team.
d. Good basketball playing takes practice and determination.

4. The people of colonial America would be horified at what is considered to be acceptable language on TV today.

Many older people today are against when they hear the words to some rap music songs.

How are these two sentences related?

a. The second sentence provides an example of what is stated in the first.
b. The second sentence provides a comparison with the idea stated in the first.
c. The first sentence states a cause and the second sentence states an effect.
d. The second sentence provides a solution to the problem stated in the first.

5. Aerobic exercises done vigorously for 15 or more minutes at a time increase the heart rate.

A carefully followed aerobic exercise program can strengthen the heart.

What is the relationship of the second sentence to the first?

a. The second sentence explains the first.
b. The second sentence contradicts the first.
c. The second sentence states an effect or outcome.
d. The second sentence states a cause.
6. Today, people who type their papers using a word processing program on a computer scoff at those who still use typewriters.

A word processing program allows the typist to make corrections and save them, whereas one must re-type a whole page to correct a mistake if using a typewriter.

What is the relationship of the second sentence to the first?

a. The second sentence provides a contrast to the first sentence.
b. The second sentence provides a comparison to the first sentence.
c. The second sentence states a cause of the effect found in the first sentence.
d. The second sentence provides more information on the idea of the first sentence.

7. At one time, one could only trace one's family ancestry by writing letters, visiting courthouses, and begging relatives for any crumb of information. However, today with the World Wide Web, the task has become much simpler. Much of the archived history of our lives and our ancestors' lives is readily available on-line. In addition, there are specific software programs in existence that will walk you through the process of creating a family tree and take you to appropriate Internet sites for record information. Another alternative is hiring someone or some company to do your tree for you. Depending on your dedication and time, a method is available for you.

You might think about tracing your family roots. It is fun for many and will let you in on your family's past. Even if you find a skeleton in the closet, maybe you could just ignore that twig of your family tree.

We may infer from the passage that

a. When we trace our family's history, we may find bad as well as good things.
b. Tracing our family tree is not worth the effort.
c. The records we must search in order to come up with a family tree have changed due to the World Wide Web.
d. Tracing one's family tree is worthwhile for everyone.

8. He was not an immoral or an illogical man, yet in these postwar times he wanted to follow his dreams and do all of the crazy things that he had always wanted to do. The interpersonal relationships he had formed during the war had faded as his friends had dispersed, and now he was completely autonomous. He had a universal goal that bound all of his dreams together and could not be submerged: to enjoy himself. Would he be misguided if he pursued his dream to circumnavigate the world in his boat? Other people might consider his abnormal for doing this, but he didn't care. Would he ever return to the ordered, predictable life he had before as a financial advisor? Although his position was hardly defensible, for now he was committed to his dream of independence.
The man described in the passage most probably

a. wants to change jobs.
b. should not pursue his dream because it would involve abandoning his family.
c. misses his wartime buddies.
d. finds himself with a new freedom after serving in the armed forces and wants to make the most of the opportunity.

9. The name of Transylvania County in North Carolina might first conjure up thoughts of Dracula and bloodthirsty vampires. Some may even think it is a fictional place. It is, however, a real county in the western mountains of our beautiful state. The county is filled with winding roads, quaint little towns, and best of all... many, many, waterfalls.

The county has numerous rivers, streams intertwined within the valleys, hills, gorges, and mountains in the area. If you take a trip through the county, you'll use your brakes a lot, as you will round many curves and go down many hills. Your gas pedal will be used as well, as you have to give your ride extra push power to climb the steep hills on your journey. The rewards are worth it. You'll round a bend in the road, look to your left or right, and a beautiful waterfall with clear, white-blue water will be crashing down the side of a rocky mountain face, and landing with a bubbly, frothy splash in the stream below. There you will be tempted to pull over and watch as the water begins its continued journey down the river stream climbing and playing among boulders as massive as the vehicle you just left parked along the roadway. You'll be tempted to climb the rocks to play in the water and even to perhaps go with the water.

Just then you'll likely remember your vehicle, and where you are. You'll hike back, load up, and go around the next curve and up the next hill, where you'll again be blessed with a view of water doing a new dance in a new way in another of the magical waterfalls of Transylvania County. In this county, there is no Dracula, although there may be a few mountain bats. But mostly there is beauty, lots and lots of beauty.

From this passage, we may conclude that

a. The novel Dracula by Bram Stoker takes place in Transylvania County, North Carolina.
b. There is no such thing as a Vampire Bat.
c. Transylvania County is a fine place to go for a quiet mountain vacation.
d. Transylvania County has a lot of history.

10. People today make life too difficult for smokers. Smokers today are segregated from nonsmokers in the workplace, school, and restaurants, among other places. Both of my parents have smoked for all of their adult lives and neither one has had lung or heart problems because of it. A little secondhand smoke is, at best, just an inconvenience for nonsmokers, not a life-threatening assault on their health.
The author’s tone is 

a. persuasive  
b. defensive  
c. neutral  
d. critical

The author would agree that: 

a. smoking should be a personal choice  
b. nonsmokers should be segregated  
c. smoking killed his father  
d. young children should be allowed to smoke if they want to

11. Stricter gun control laws won’t help our crime rates. Just like when Prohibition laws were enacted and people began to make whiskey illegally, people will find a way to purchase guns if they want to and create a field day for the black market. Also, some people want to use guns honestly, for self-protection or for legal hunting purposes. Let’s find another way to deal with crime without penalizing those who have good reasons for purchasing and keeping guns.

The author’s tone is 

a. admiring  
b. begrudging  
c. neutral  
d. persuasive

The author would agree with which of the following statements?

a. America needs more gun owners.  
b. Guns don’t cause violence.  
c. We should revoke some gun control laws.  
d. We need more gun control laws.

12. Young people today have it much easier than we did, and yet they still complain that life is too hard. Teenagers, especially, don’t want to lift a finger to help around the house, but still expect their parents to buy them luxuries like cars and CD players. When I was young, I was thankful just to have indoor plumbing and electricity, and I was expected to do my share of chores.

The author’s tone is 

a. admiring  
b. contemptuous  
c. neutral  
d. persuasive
The author would agree that:__________.

a. indoor plumbing is a bad idea.
b. parents shouldn’t ask too much of their children.
c. teenagers aren’t capable of hard work.
d. parents should ask more of their children.
ANSWERS KEY TO THE READING PRACTICE TEST

Finding the Stated or Implied Main Idea
1. b
2. d
3. a

Determining Sentence Relationships
4. b
5. c
6. c

Finding Inferences and Drawing Conclusions
7. a
8. d
9. c

Determining the Author's Tone
10. b, a
11. d, c
12. b, d
Arithmetic Review

The arithmetic portion of the Accuplacer Placement test consists of seventeen multiple choice questions. These questions will measure skills in computation of whole numbers, fractions, decimals, and percentages and will include simple geometry and application problems. Use of calculators is not permitted. Scrap paper will be provided and must be turned in at the end of the testing session. Please make certain that your cell phone is turned off during the testing session.

ORDER OF OPERATIONS WITH WHOLE NUMBERS

Solving problems with several operations requires doing each step in the correct order. The procedure is:
1) Do all operations inside parentheses, brackets, and braces
2) Do all exponents and square roots
3) Do all multiplication and division from left to right
4) Do all addition and subtraction from left to right

\[
\begin{align*}
2(6-4)^2 + 10 \\
2(2)^2 + 10 \\
2(4) + 10 \\
8 + 10 \\
18
\end{align*}
\]

ADD AND SUBTRACT UNLIKE FRACTIONS

You have probably heard the expression, “That's like comparing apples and oranges.” When someone uses this expression, he is implying that the items or ideas being discussed are different. If there is a bowl containing seven apples and six oranges, you could say that there are thirteen pieces of fruit in the bowl. Using the common label of fruit is similar to using a common denominator for adding, subtracting, and comparing fractions. The term least common denominator refers to the smallest number that has all of the denominators as factors.

\[
\begin{align*}
\frac{1}{4} + \frac{1}{3}
\end{align*}
\]

In order to solve this problem, we need to have a common denominator. The denominators (the bottom numbers of fractions) are three and four. The smallest number that has both three and four as factors is twelve. Before we add, we must change these fractions to equivalent fractions with denominators of twelve. Equivalent fractions are numbers that have the same value.

\[
\begin{align*}
\frac{1}{2} = \frac{2}{4} = \frac{5}{10} = \frac{16}{32}
\end{align*}
\]

All of these fractions have the same value.
\[
\frac{1}{4} = \frac{3}{12} \quad \text{and} \quad \frac{1}{3} = \frac{4}{12}
\]

Once we have changed the original fractions to equivalent fractions with the same denominators, we add the numerators (the top numbers of fractions) and keep the same denominator.

\[
\frac{3}{12} + \frac{4}{12} = \frac{7}{12}
\]

The method is the same despite the number of fractions being added.

\[
\frac{3}{4} + \frac{3}{8} + \frac{3}{16}
\]

The least common denominator for this set is sixteen. Before we add, we will change them to equivalent fractions with a denominator of sixteen.

\[
\frac{3}{4} = \frac{12}{16} \quad \text{and} \quad \frac{3}{8} = \frac{6}{16} \quad \text{Since} \quad \frac{3}{16} \quad \text{already has the needed denominator, it will remain the same.}
\]

\[
\frac{12}{16} + \frac{3}{16} + \frac{6}{16} = \frac{21}{16}
\]

The number \(\frac{21}{16}\) is considered an improper fraction because the numerator is larger than the denominator. To change this to a mixed number, divide the denominator into the numerator. The quotient becomes the whole number, the remainder becomes the new numerator, and the denominator stays the same. Therefore \(\frac{21}{16} = 1\frac{5}{16}\).

Follow the same procedure for subtracting fractions.

\[
\frac{7}{10} - \frac{1}{5}
\]

Once you have determined that the least common denominator (LCD) is ten,
change \(\frac{1}{5}\) to the equivalent fraction \(\frac{2}{10}\).

\[
\frac{7}{10} - \frac{2}{10} = \frac{5}{10}
\]

The fraction \(\frac{5}{10}\) should be reduced to the equivalent fraction \(\frac{1}{2}\).

All fractional answers on the CPT exam are in reduced form.

**MULTIPLYING AND DIVIDING FRACTIONS**

Common denominators are not required for multiplying and dividing fractions. To multiply fractions, multiply the numerators and write the result as the new numerator, multiply the denominators and write the result as the new denominator, and reduce if needed.

\[
\frac{1}{3} \times \frac{2}{5} = \frac{2}{15}
\]

To divide fractions, multiply the dividend by the reciprocal of the divisor.
To work this problem, \( \frac{1}{3} \div \frac{1}{2} \) rewrite as a multiplication problem \( \frac{1}{3} \times \frac{2}{1} \) and multiply using the method described above. \( \frac{1}{3} \times \frac{2}{1} = \frac{2}{3} \)

Before multiplying and dividing mixed numbers, change the numbers to improper fractions by multiplying the whole number by the denominator and adding the numerator to get the new numerator. The denominator remains the same. \( 1 \frac{1}{4} \times 3 \) is rewritten as \( \frac{5}{4} \times \frac{3}{1} \), which results in the improper fraction \( \frac{15}{4} \). This could be changed to the equivalent mixed number \( 3 \frac{3}{4} \), by dividing the denominator (bottom number) into the numerator (top number).

**ADD AND SUBTRACTION OF DECIMALS**

To add and subtract numbers containing decimals, line up the decimals and add or subtract as you would whole numbers.

\[ 1.2 + 3.44 + 6.208 + 4.7 = 15.548 \quad \text{and} \quad 16.025 - 1.43 = 14.595 \]

**MULTIPLYING DECIMALS**

To multiply numbers that contain decimals, first multiply as you would with whole numbers. Then count the number of places to the right of the decimal in each number and counting from the right of the answer, move the decimal that number of places to the left. Add zeros (to the left) if needed to obtain the correct number of decimal places.

Ex. Multiply \( 0.1 \times 0.1 = 0.01 \)

To solve this problem \( 1.34 \times 6.5 \), first multiply as you would if there were no decimals, which would give the result 8710. Then count the number of places to the right of the decimal in both of the original numbers—two in 1.34 and one in 6.5 for a total of three. Then starting at the right of the answer (to the right of the zero), count three places to the left. The decimal will be between the 8 and the 7, for a final answer of 8.710

**DIVIDING DECIMALS**

To divide numbers containing decimals, make the divisor into a whole number by moving the decimal to the right. In the problem \( 0.54 \div 1.8 \), 0.54 is the dividend and 1.8 is the divisor. Change 1.8 to a whole number by moving the decimal one place to the right. Then before dividing, move the decimal in the dividend the same number of places. Add zeros, if necessary. In this case, 0.54 becomes 5.4. When you write it as a division problem, there should be no decimal left in the divisor. Then write the decimal for the quotient (answer) above the position of the decimal in the dividend.

First write \( 0.54 \div 1.8 \) as \( 1.8\overline{0.54} \). Next rewrite 1.8 as a whole number by moving the decimal one place to the right, and move the decimal in 0.54 the same number of places
Then write the decimal for the quotient directly above where it is in the dividend and divide as you would divide whole numbers. \[ 0.3 \]

Follow the same procedure for this example: \( 58.24 \div 1.12 \) Rewrite as \( 1.12 \overline{58.24} \) Move the decimal in the divisor two places to the right, and move the decimal in the dividend the same number of places. Then write the decimal in the quotient directly above the decimal in the dividend and divide following the method for whole numbers: \( 112 \overline{5824} \) To check your answer, multiply the quotient by the divisor and the result should be the dividend. \( 1.12 \times 52 = 58.24 \)

**ROUNDING NUMBERS**

To correctly round numbers, you will need to know the rules for rounding and the place values of numbers. The numbers to the left of the decimal are whole numbers. \( 1,234,506.789 \) In this number the six is in the ones place, the zero is in the tens place, the five is in the hundreds place, the four is in the thousands place, the three is in the ten-thousands place, the two is in the hundred-thousands place, and the one is in the millions place. To the right of the decimal, the seven is in the tenths place, the eight is in the hundredths place, and the nine is in the thousandths place. The number would be read as, "One million, two hundred thirty-four thousand, five hundred six, and seven hundred eighty-nine thousandths."

The rules for rounding are:
1) Locate the place to be rounded to
2) Look at the number in the place to the right of the place to be rounded to
3) If that number is five or larger, add one to the place to be rounded to. If that number is four or smaller, the number to be rounded to stays the same.
4) Write the rounded number by rewriting all the digits to the left of the place being rounded to and the digit in the rounded place. Change the numbers to the right of the place being round to into zeros.

To round this number \( 1,234,506.789 \) to the nearest hundredths place:
1) Determine that 8 is the number in the hundredths place
2) Note that the number to the right (9) is larger than five
3) Add one to the place being rounded to \((8 + 1 = 9)\)
4) Rewrite as: \( 1,234,506.79 \)

To round this number \( 1,234,506.789 \) to the nearest hundreds place:  
Determine that the number in the hundreds place is five and the number to the right is zero, which is smaller than five. Rewrite as \( 1,234,500 \)
PERCENTS
The percent symbol represents one one hundredth, which can be written $\frac{1}{100}$ or 0.01. To change a number from a percent to a decimal, move the decimal point two places to the left (the result of multiplying by 0.01) and rewrite without the percent symbol. To change a number from a decimal to a percent, move the decimal point two places to the right (the result of multiplying by 100) and rewrite with the percent symbol.

50% = 0.50
23% = 0.23

To change a percent to a fraction, first change it to a decimal, and then rewrite it as a fraction.

$50\% = 0.50 = \frac{50}{100}$ which reduces to $\frac{1}{2}$

$23\% = 0.23 = \frac{23}{100}$

GEOMETRY

The formulas for the perimeter and area of rectangles are $P = 2l + 2w$ and $A = l \times w$ where $l$ represents the length and $w$ represents the width. These formulas would be used to solve the following example problems.

A gardener wants to put a fence around his vegetable patch to prevent animals from eating his plants. The length of the garden is 40 feet and the width is 25 feet. How many feet of fence does he need to purchase?

$P = 2l + 2w$
$P = 2(40) + 2(25)$
$P = 80 + 50$
$P = 130$ feet

A decorator wants to put new carpet in his office. The office measures 16 feet by 11 feet. How much carpet does he need to purchase?

$A = l \times w$
$A = (16)(11)$
$A = 176$ ft.$^2$

$ft^2 =$ square feet not $176^2$
ARITHMETIC PRACTICE TEST

1) In a recent election, 51% of the voters were against a tax increase, 22% were for the tax increase, and the remaining voters were undecided. Write the number of undecided voters as a fraction.

   a) \(\frac{73}{100}\)
   b) \(\frac{29}{100}\)
   c) \(\frac{27}{100}\)
   d) \(\frac{37}{100}\)

2) A recipe calls for \(\frac{3}{4}\) cup of sugar to make two dozen cookies. If you only wanted to make one dozen cookies, how much sugar should you use?

   a) \(\frac{1}{12}\) cup
   b) \(\frac{3}{8}\) cup
   c) \(\frac{3}{2}\) cup
   d) \(\frac{3}{6}\) cup

3) Michael walked \(3\frac{1}{2}\) miles on Monday and \(3\frac{1}{5}\) miles on Tuesday. How much farther did he walk on Monday than Tuesday?

   a) \(\frac{1}{3}\) mile
   b) \(\frac{1}{2}\) mile
   c) \(\frac{3}{10}\) mile
   d) \(\frac{1}{10}\) mile
4) Divide: $4.23 ÷ 9$
   a) 0.47 
   b) 4.7 
   c) 2.12 
   d) 21.2

5) Divide $2\frac{1}{4} ÷ 1\frac{1}{8}$
   a) $1\frac{1}{2}$ 
   b) $2\frac{1}{2}$ 
   c) 2 
   d) $1\frac{1}{4}$

6) Jennifer had $182.17 in her checking account. After she wrote a check for $11.72 to the water company and a check for $81.40 to the electric company, how much did she have left in her checking account?
   a) $89.05$ 
   b) $100.77$ 
   c) $90.05$ 
   d) $90.99$

7) A developer has decided to fence in a playground area. If the length of the playground is 70 yards and the width is 52 yards, how much fence does she need to purchase?
   a) 122 yards 
   b) 244 yards 
   c) 210 yards² 
   d) 3640 yards²
8) Marion Jones jumped 22 feet 9 inches at the Prefontaine Classic, and she jumped 22 feet 2 ½ inches during her trial for Olympic competition. How much longer was her previous long jump than her Olympic trial long jump?

   a) 5 ½ inches
   b) 1 ½ inches
   c) 7 ½ inches
   d) 6 ½ inches

9) Cynthia's test scores in her BIO 110 class are 91, 92, 88, 100, 97, and 82. What is her current test average rounded to the nearest hundredth?

   a) 91.66
   b) 91.67
   c) 91.666
   d) 91.667

10) The answer to this multiplication problem will be closest to which of these whole numbers? \[5.03 \times 0.92\]

   a) 45
   b) 5
   c) 6
   d) 7

11) Mrs. Sanford's monthly salary is $1200. If she pays ¼ of that in taxes, what is her monthly take home pay?

   a) $900
   b) $300
   c) $400
   d) $450

12) At the last state council meeting, there were 15 people from the western region and 35 people from the eastern region. What percent of the attendees were from the western region?

   a) 15%
   b) 30%
   c) 35%
   d) 22.5%

13) Michael walked 3 \(\frac{1}{2}\) miles on Monday and 3 \(\frac{1}{5}\) miles on Tuesday. How far did he walk altogether?

   a) 6 miles
   b) 6 \(\frac{6}{7}\) miles
14) A developer has decided to fence in a playground area. She decided to cover the ground with Astroturf. If the length of the playground is 70 yards and the width is 52 yards, how much Astroturf does she need to purchase?

   a) 122 yards
   b) 244 yards
   c) 210 yards²
   d) 3640 yards²

15) I recently traveled 225.5 miles using 11 gallons of gas. What was my average in miles per gallon?

   a) 20.5 mpg
   b) 2.5 mpg
   c) 21.5 mpg
   d) 25 mpg
Arithmetic Answers and Solutions

1) **Answer: c**
Solution: Add together the number of voters that were against the tax increase and for the tax increase for a total of 73% of the voters that have already decided. Subtract this number from 100 to find the percentage of voters that have not decided. 100 - 73 = 27% or $\frac{27}{100}$

2) **Answer: b**
Solution: Since you only want to make half of the recipe (one dozen is half of two dozen), you would multiply the amount of sugar by $\frac{1}{2}$.

\[
\frac{3}{4} \times \frac{1}{2} = \frac{3}{8} \text{ cup}
\]

3) **Answer: c**
Solution: The question asks how much farther indicating subtraction. We must find a common denominator among the fractions before subtracting. The LCD for 2 and 5 is 10. Then convert the mixed numbers to equivalent numbers with the same denominator. $3 \frac{1}{2} = 3 \frac{5}{10}$ and $3 \frac{1}{5} = 3 \frac{2}{10}$

Subtract the whole numbers, subtract the numerators, and keep the same denominator.

\[
3 \frac{5}{10} - 3 \frac{2}{10} = \frac{3}{10} \text{ mile}
\]

4) **Answer: a**
Solution: $4.23 \div 9$ should be rewritten as $9 \div 4.23$, and the decimal should be written in the quotient directly above the decimal in the dividend. Then divide as with whole numbers. $9 \div 4.23$

5) **Answer: c**
Solution: First change the mixed numbers to improper fractions by multiplying the whole number by the denominator and adding the numerator to get the new numerator, and keep the same denominator. $2 \frac{1}{4} = \frac{9}{4}$ and $1 \frac{1}{8} = \frac{9}{8}$

Then divide by multiplying the dividend by the reciprocal of the divisor. $\frac{9}{4} \div \frac{9}{36} = \frac{72}{36}$, which reduces to 2.
6) **Answer: a**  
Solution: Line up the decimals to subtract the value of both checks from the original amount in the checking account. $182.17 - 11.72 = 170.45$ and $170.45 - 81.40 = 89.05$

7) **Answer: b**  
Solution: The perimeter of a polygon is found by adding all of the sides, or in the case of this rectangle using the formula $2l + 2w = P$. $2(70) + 2(52) = 244$ yards.

8) **Answer: d**  
Before subtracting, find the common denominator of 2. Borrow 1 from the whole number 9, just as done when subtracting with whole numbers. The 1 becomes the fraction $\frac{2}{2}$. Now rewrite as $\frac{2}{2} - 2\frac{1}{2}$. Subtract the whole numbers, subtract the numerators, and keep the same denominator.

9) **Answer: b**  
Solution: To find the average of a set of numbers, add all of the numbers, in this case, the test scores, and divide by the number of items, in this case 6 tests.  

$$
\frac{91 + 92 + 88 + 100 + 97 + 82}{6} = 91.666
$$

To round to the nearest hundredth place, look to the thousandths place, determine that it is higher than four, and add one to the hundredths place.

10) **Answer: b**  
To estimate the answer to this multiplication problem, round each factor to the nearest whole number. 5.03 rounds to 5 and 0.92 rounds to 1. Multiply these rounded numbers to estimate the product. $5 \times 1 = 5$.

11) **Answer: a**  
Solution: To find out how much Mrs. Sanford pays in taxes each month, multiply her monthly salary by $\frac{1}{4}$. $1200 \times \frac{1}{4} = \frac{1200}{4}$, which reduces to $300$. To determine her monthly take home pay, subtract $300 from her monthly salary. $1200 - 300 = 900$.

12) **Answer: b**  
Solution: First establish the number of people that attended the meeting by adding together the numbers from each region. $15 + 35 = 50$. This means that 15 of the 50 people in attendance were from the western region. To write this as a percentage, first write as a fraction $\frac{15}{50}$. Change the fraction to a decimal by dividing the denominator into the numerator. $\frac{0.30}{50}$ Then change the decimal
to a percent by moving the decimal point two places to the right and adding the % symbol. 0.30 = 30%  

13) Answer: d  
Solution: Before adding, change these mixed numbers to equivalent numbers with the common denominator of 10.

\[
3 \frac{1}{2} = 3 \frac{5}{10} \quad \text{and} \quad 3 \frac{1}{5} = 3 \frac{2}{10}
\]

Then add the whole numbers, add the numerators, and keep the same denominator.

14) Answer: d  
Solution: To find the area of a rectangle, multiply the length by the width and write the answer with square units.

15) Answer: a  
Solution: Think of the word per as a clue word to signal division.

\[
\begin{align*}
20.5 \\
11)225.5
\end{align*}
\]
Algebra Placement Test Review

Recognizing the Relative Position between Real Numbers

A. Which number is smaller, 2 or -2000? To really appreciate which number is smaller one must view both numbers plotted on the same number line.

In comparing two numbers the smaller number always plots to the left of the larger number on the number line. This rule says that -2000 is smaller than 2.

Examples:
1040 < 10,400
-37 < 37
-1 > -4
Note: < means “less than” and > means “greater than”. Remember to always point the arrow head towards the smaller number.

Put the following numbers in order from smallest to largest:
13, -223, 322, 0, 1330, -2

Answer: -223, -2, 0, 13, 322, 1330

Add, Subtract, Multiply, Divide Real (Signed) Numbers

A. Every number has two characteristics, direction and magnitude. Direction has to do with the sign of the number, either positive (+) or negative (-). When conducting mathematical operations (Add, Subtract, Multiply, or Divide) on numbers the signs of the numbers play a big part in the sign of the answer. Here are some examples:

Addition: \(-3 + 2 = -1\)  
Subtraction: \(-6 - 2 = -8\)

Multiplication: \((-3)(4) = -12\)  
Division: \(8 \div (-2) = -4\)

In doing math operations on numbers you may be asked to add or multiply more than 2 numbers in a problem. You can only add or multiply two numbers at a time and then apply that result to the next number. The following rules apply to all math operations.

B. Adding or Subtracting two numbers:

Rule 1: If the numbers have like signs, add and keep the common sign.

Rule 2: If the numbers have different signs, subtract and use the sign of the larger original number.
Examples: \( 7 - 4 = 3 \), \( -6 + 2 = -4 \), \( 8 - 7 = -15 \), \( 9 + 7 = 16 \)

C. Multiplying or dividing two numbers:

Rule 1: If the signs of the two numbers to be divided or multiplied are the same, the result will be positive.

Rule 2: If the signs of the two numbers to be divided or multiplied are different, the result will be negative.

Examples: \((7) (-4) = -28\), \(6 \div (-2) = -3\), \((-9) (-2) = 18\), \(-8 \div -4 = 2\)

D. The only detail to work out now is to understand what to do if there are two signs between two numbers, i.e., \(5 - (-3)\). Any time there are two signs that are adjacent they can be replaced with one sign as follows:

When two adjacent signs are the same, they can be replaced by a positive (+) sign. When two adjacent signs are different, they can be replaced by a negative (-) sign. The single sign can then be manipulated as per the instructions above.

Examples: \(-4 + (-5) = -4 - 5 = -9\) \(9 - (-5) = 9 + 5 = 14\)

**Absolute Value Concept**

A. Recall that every number has two characteristics, magnitude and direction. The sign indicates on which side of zero the number will plot. A positive number will plot to the right and a negative number to the left of zero. The magnitude of a number indicates how far the number will plot from zero. The absolute value of a number is the distance from the plotted location of the number to zero without regard for direction. The absolute value of a number is the magnitude of that number. Two vertical lines, one on either side of the number indicates absolute value. Absolute values are always positive.

Examples: \(|-4| = 4\) \(|13| = 13\) \(-|-7| = -7\)

**Operations with Algebraic Expressions**

A. Algebraic terms are monomials that may include one or more variable factors (that may be raised to a power) multiplied by a numerical factor. An example would be: “\(4x^2y\)” which means “4 times x times x times y”. 4 is a numerical factor. x and y are variable factors. Notice that the terms involve the multiplication of numerical and variable factors. A variable is simply a letter that stands for a number because we do not yet know the value of the number. Other examples of algebraic terms are:

\(7z, -32a, 14, x^4y^6z^3, mn, 1, abcd\)
B. Algebraic expressions occur when Algebraic terms are added or subtracted. An example would be:

\[ 4x^2 y - 2x + 3 \quad \text{This is an expression consisting of 3 terms (} 4x^2 y, 2x, \text{ and } 3) \]

Other examples: \( 6x + 4, x^2 + 5x - 6, 3, 9y^2 - 36, -8x \)

C. Solution of equations often requires the simplification of an algebraic expression. The intent is to manipulate the expression to put it in the simplest form possible. Use of the Distribution Property and gathering like terms can be required.

**Using the Distributive Property**

A. To evaluate the product of 5 times the sum of 3 and 4 \( [5(3+4)] \) you would simply add the 3 and 4 and multiply that sum, 7, by 5 to get 35. Another way to get this answer would be to multiply 5 times 3 (15) and 5 times 4 (20) and the sum of 15 and 20 is 35, which is the same answer. This second process is called distribution. The multiplication by 5 is being distributed over the sum of 3 and 4. You can also distribute over subtraction. [6 (9-7) = 6(9) - 6(7) = 54 - 42 = 12] or 6(9-7) = 6(2) = 12.

You would never use the distribution in evaluating pure numerical expressions because following the order of operations rules are quicker and easier. However if you want to find the product of 5 and the sum of \( x \) and 4 \( [5(x+4)] \) you cannot use order of operations procedures because you cannot add \( x \) and 4. Now you have to distribute the multiplication of 5 over the sum of \( x \) and 4.

\[ 5(x+4) = 5x + 5(4) = 5x + 20 \]

Examples:

- \( 3(y-2) = 3y - 3(2) = 3y - 6 \)
- \(-5(a + 3) = -5a + (-5) 3 = -5a + (-15) = -5a - 15 \)
- \( x(y + 6) = xy + 6x \)

B. More formally the act of distributing multiplication across addition or subtraction looks like:

\[ A ( B + C ) = AB + BC \quad \text{or} \quad A ( B - C ) = AB - BC \]

Examples: \( 2(x + 4) = (2)x + (2)4 = 2x + 8 \)

\[ \frac{1}{3} (2x - 6) = \left( \frac{1}{3} \right) \left( \frac{2}{1} \right) x - \left( \frac{1}{3} \right) \left( \frac{6}{1} \right) = \frac{2}{3} x - 2 \]

C. Gathering like terms: Like terms are algebraic terms that have exactly the same variable portion. The terms 3x and -5x are like terms because the variable portion of each terms ix exactly the same (x). The terms 7x and 2x^2 are not like terms because x is not x^2. Similarly, 14x and 8y are not similar terms. Being able to
recognize like terms is important because only like terms can be added and subtracted.

Examples:  
7x + 2x = 9x  
2x + 2y - 6x = -4x + 2y  
2x^2 + 9x - 4x + 2 = 2x^2 + 5x + 2

E. Simplifying Expressions. Below are a few examples.

1. 3(2x - 4) + 8 = 6x - 12 + 8 = 6x - 4
2. 12 - 4(x + 1) = 12 - 4x - 4 = -4x + 8
3. 2(3 - 2x) + 3y = 6 - 4x + 3y = -4x + 3y + 6

F. Evaluating an expression. You cannot solve an expression, but you can evaluate an expression if you are given the values of the variables in the expression. This is often required to check a solution of a problem you have solved.

Example: What is the value of 4x + 2y if x = 3 and y = 4?  
4(3) + 2(4) = 12 + 8 = 20

The value of the expression when x = 3 and y = 4 is 20. Finding the value of an expression requires that the variable values be substituted in place of the variables in the expression and the mathematical operations be accomplished to find the value of the expression. Always put values in parentheses.

Solving Equations and Formulas

A. Algebraic equations occur when one or more terms are set equal to one or more other terms. Here's an example:

4x^2 - 2x + 3 = 4x - 27  
In this equation one expression (4x^2 - 2x + 3) is set equal to another expression (4x - 27).  
Note that this is an equation consisting of one variable(x). This equation can be solved for x.

B. Solving an equation means to mathematically manipulate the terms and numbers in the equation until you get the variable you are solving for on one side of the equal sign with a coefficient of positive one. In some cases the answer may be a number. In other cases (formulas) the answer may include one or more variables. There are only two tools used to solve equations. The first tool is the Addition Property of Equality. It says you can add (subtract) the same thing (number or variable) to (from) each side of an equation and you will not change the solution.
Example: \( x + 3 = 5 \)  
You can see that \( x \) must be 2 to make the equation true. Remember we are trying to get \( x \) by itself on one side of the equation. That means that we must somehow get rid of the 3 on the left side of the equation. Since it is a positive 3 let's subtract 3 from both sides.

\[
x + 3 - 3 = 5 - 3
\]
\[
x = 2
\]

After doing the math operations, this becomes \( x = 2 \). That is the solution that we could see above. It is not always possible to see the answer.

D. The second solution tool is the **Multiplication Property of Equality**. This property says that you can multiply (or divide) both sides of an equation by the same thing (number and/or variable) and you will not change the solution.

Example: \( 2x = 8 \)  
It can be seen that \( x \) must be 4 to make this an equality. To get \( x \) on the left hand side with a coefficient of 1 the 2 must be changed into a 1. The easy way to change any number into a 1 is to divide the number by itself. In this case we will divide both sides by 2.

\[
\frac{2}{2} x = \frac{8}{2}
\]

\[
1x = 4.
\]

Therefore the solution is 4.

E. Here's an example requiring both tools to be used in solving the equation.

\[
4x - 3 = 13
\]

It is always appropriate to use the Addition Property first before using the Multiplication Property.

\[
4x - 3 + 3 = 13 + 3
\]

\[
4x = 16
\]

The Addition Property can no longer be used, but use of the Multiplication Property is now required.

\[
\frac{4}{4} x = \frac{16}{4}
\]

\[
x = 4.
\]

If this answer is plugged back into the original equation \( 4(4) - 3 = 13 \) or \( 16 - 3 = 13 \) or \( 13 = 13 \) an equality is achieved indicating that \( x = 4 \) is a correct solution.

F. When equations contain 2 or more variables they are called **formulas**. You may recognize many formulas from past math classes. Examples are:

\[
3x + 2y = 4
\]

Linear equation

\[
C = 2\pi r
\]

Circumference of a circle

\[
P = 2L + 2W
\]

Perimeter of a rectangle

\[
I = PRT
\]

Interest calculation

G. Formulas (equations) can be evaluated or solved. Solving equations will be dealt with in the next section. Here is an example of evaluating a formula. Again you must be given values of some variable(s) to find the value of one of the variables in the formula.
Using the formula \( P = 2L + 2W \) find the value of \( P \) if \( L = 8 \) and \( W = 3 \).
\[ P = 2(8) + 2(3) = 16 + 6 = 32 \]

**H.** In solving a formula for one variable the answer often contains one or more variables.
Example:

Solve the formula \( 2a - 4c = 3b + 4c - 4c \) for \( b \).

\[
2a - 4c = 3b + 4c - 4c
\]

\[
2a - 4c = 3b
\]

To get \( b \) on the right hand side by itself, both sides must be divided by 3.

\[
\frac{2a - 4c}{3} = \frac{3}{3} b
\]

\[
\frac{2a - 4c}{3} = b
\]

**Rules for Exponents**

**A.** The mathematical manipulation of exponential terms in Algebra requires you to now the following rules.

1. Rule I: \( a^r a^s = a^{r+s} \)

   Example: \( x^4 x^3 = x^7 \)

2. Rule II: \( (a^r)^s = a^{rs} \)

   Example: \( (x^2)^5 = x^{10} \)

3. Rule III: \( (ab)^r = a^r b^r \)

   Example: \( (x^2 y^3)^3 = x^6 y^9 \)

4. Definition: \( a^{-r} = \frac{1}{a^r} \)

   Example: \( x^{-3} = \frac{1}{x^3} \)
5. Rule IV: \( \frac{a^r}{a^s} = r-s \)

   Examples: \( \frac{x^8}{x^{-3}} = x^{8-(-3)} = x^{11} \)

6. Rule V: \( \left( \frac{a}{b} \right)^r = \frac{a^r}{b^r} \)

   Examples: \( \left( \frac{x^2}{y^5} \right)^3 = \frac{x^{6}}{y^{15}} \)

### Multiplying Monomials and Polynomials

A. A monomial is just another name for an Algebraic term.
   Examples: 7, 3x, -3x^2 y, 21ab^3 c^2

B. A polynomial is two or more terms strung together with addition or subtraction signs.
   Examples: x + 3, 7y -6, 2x + 3y -4, x^2 +4x+2

C. Multiplying a polynomial by a monomial requires the use of the Distributive Property.
   Example:
   \[ 3x(x + 4) = (3x) 2x + (3x) 4 = (3)(2)(x)(x) + (3)(4)(x) = 6x^2 + 12x \]

D. Multiplying a binomial (two term polynomial) by another binomial requires another technique other than the use of the distributive property.

This technique is called FOIL. F stands for first terms, O stands for outer terms, I stands for inner terms, and L stands for last terms.

\[
\begin{align*}
\text{First} & \quad \text{Last} \\
(x + 2) & \quad (x - 3) \\
\text{Inner} & \\
\text{Outer} & \\
\end{align*}
\]

F is the product of the first terms: \((x)(x) = x^2\)
O is the product of the outer terms: \((-3)(x) = -3x\)
I is the product of the inner two terms: \((2)(x) = 2x\)
L is the product of the last two terms: \((2)(-3) = -6\)
\[(x + 2)(x - 3) = x^2 - 3x + 2x - 6 = x^2 - x - 6\]

Note: The O and the I products generally generate like terms and must be Combined as indicated in above example \((-3x + 2x = -x)\).

**Special Products**

A. The first special product is the Perfect Square Trinomial

\[(a + b)^2 = aa + ab + ab + bb \text{ or } a^2 + 2ab + b^2\]

\[(a - b)^2 = (a - b)(a - b) = a^2 - ab - ab + b^2 = a^2 - 2ab + b^2\]

B. The second special product is the Difference of Two Squares. Any numerical factor and variable factor must be a perfect square.

Example: \((a + b)(a - b) = aa - ab + ab + bb = a^2 - b^2\)

Note: \(a^2 - b^2\) is the difference of the two squares, \(a^2\) and \(b^2\).

**Factoring**

A. In this Algebra review, up to now, we have learned how to mathematically manipulate Algebraic terms and expressions to get an answer. We have been learning how to use some unique building tools to fabricate (build) a result. Factoring involves the opposite technique—how to break down an expression into its basic building blocks. We are going to learn the solution techniques to find the values of \(X\) that are solutions for the equation \(2x^2 + 10x + 12 = 0\).

B. Factoring using the Greatest Common Factor (GCF). This is basically using the Distribution Property in reverse. When required to factor an expression or use factoring to solve an equation it is imperative to always first see if a GCF can be factored out. In looking at the expression \(3x + 9\), is there a number or variable that is common to each term? Yes, 3 is common to both terms. If 3 is divided (or factored) out of both terms the result is \(3(x + 3)\)

Example: Factor the GCF out of \(8y^3 - 12y^2\)

The technique is to find the largest number, if any, that will divide evenly into each term and the largest power of a variable term, if any, that is common to each term. Inspection of each term will show that 4 is the largest number that is common to each term. Further inspection will show that \(y^2\) is the highest power of \(y\) that is common to each term.

\[8y^3 - 12y^2 = 4y^2(2y - 3)\]

The results can be checked by applying the distributive property in which you should return to the original polynomial.
C. Factor by Grouping: Typically if you are asked to factor an expression with 4 terms that cannot be combined, it is a good idea to see if the expression can be factored by grouping. For the expression \( ax + 3a + 2x + 6 \) look at the first two terms to see if they contain a GCF. The GCF would be \( a \). Now look at the last two terms. In this case 2 is the GCF. If \( A \) is factored out of the 1st two terms and 2 is factored out of the last two terms, the expression would be \( a(x + 3) + 2(x + 3) \). Now instead of having 4 terms the expression has 2 terms, and there is a GCF for these terms. That GCF is \( x + 3 \). If \( x + 3 \) is factored out of both terms, the result is \( (x + 3)(a + 2) \).

\[
ax + 3a + 2x + 6 = (x + 3)(a + 2)
\]

G. Factoring Trinomials. Trinomials of the form \( ax^2 + bx + c \) (\( a, b, c \) are real numbers) can be factored. If \( a \) is 1, the factoring process is easier. To factor \( ax^2 + bx + c \), you are looking for an answer that is in the form \((x + m)(x + n)\). The product \( mn \) must equal \( c \) and the algebraic sum of \( m \) and \( n \) must equal \( b \).

Example: \( x^2 + 2x - 8 = (x + 4)(x - 2) = xx - 2x + 4x - 8 = \)

After FOILing we see that \( x^2 + 2x - 8 \) \( a = 1 \), \( b = 2 \), and \( c = -8 \). Also \( m = 4 \) and \( n = -2 \). From above \( mn = c \) or \((4)(-2) = -8 \) and \( m-n = b \) or \((4) + (-2) = 2 \).

Example: Factor \( x^2 + 10x + 16 \).
First of all look at the factors of \( c \) \((16)\). They are: \((1, 16)\), \((2, 8)\), and \((4,4)\).
Each set of factors when multiplied gives you \( 16 \) \((c)\), but the algebraic sum of only one set of factors gives you \( 10 \) and that is \((2, 8)\).

So the factorization of \( x^2 + 10x + 16 = (x + 2)(x + 8) \) If you FOIL this answer you will get the trinomial you started out with.

I. Factorization of a polynomial \( ax^2 + bx + c \) where \( a \) does not equal 1. This factorization is much more difficult that when \( a = 1 \). The most often used factorization technique for this type problem is trial and error. Basically you look at the factor of \( a \) and the factors of \( c \) and test different combinations to get the answer.

Example: Factor \( 2x^2 + 7x + 6 \). The factor of \( a \) \((2)\) and the factors of \( c \) \((6)\) are \((1,6)\) and \((2,3)\). You must use the coefficient of \( x^2 \) to be 2, and using the factors of 2 and 3 will probably get you closer to 7 than using the factors of 1 and 6.
Remember you must multiply either 1 or 6 by 2 and then add. Using the 2 and 3 factors the possibilities are: \((2x + 2)(x + 3)\) or \((2x + 3)(x + 2)\). If you foil these two products you will see that the second set of factors is the answer.

\[
2x^2 + 7x + 6 = (2x + 3)(x + 2)
\]

K. Factorization of the Difference of Two Squares. If you are asked to factor \( x^2 - y^2 \) the answer is \((x + y)(x - y)\). Look again at 8b above.
Example: Factor $16a^4 - 81b^4 = (4a^2 + 9b^2)(4a^2 - 9b^2)$, but you are not done because $4a^2 - 9b^2$ can still be factored.
The final answer is $(4a^2 + 9b^2)(2a + 3b)(2a - 3b)$.

Remember when factoring the difference of 2 squares-always check to see if the factoring results in the difference of another 2 squares.

Note: You cannot factor $a^2 + b^2$. There are no binomials that you can multiply and get a product of $a^2 + b^2$.

**Solving Trinomials**

A. Ever since we have been talking about factorization we have factored expressions. You have not seen an equal sign since it was briefly mentioned at the beginning of 9 above. Now we want to briefly explain how to solve trinomials. If you multiply two factors and the product is zero, then either one or both of the factors must be zero. If $(p)(q) = 0$ then either $p$ or $q$ or both must be zero.

a. Trinomial solution process: The process involves factoring the trinomial and setting each factor equal to zero. Solve each equation for the variable and check the answer by substituting it into the original equation. If you get an equality the answer is a good solution.

Example: Solve $x^2 + x - 6 = 0$

$$(x - 2)(x + 3) = 0$$

$x - 2 = 0$, so $x = 2$ is a possible solution

and $x + 3 = 0$, so $x = -3$ is a possible solution

$x^2 + x - 6 = 0$

$2^2 + 2 - 6 = 0$

$4 + 2 - 6 = 0$

$6 - 6 = 0$

$0 = 0$

$x^2 + x - 6 = 0$

$(-3)^2 + (-3) - 6 = 0$

$9 - 3 - 6 = 0$

$6 - 6 = 0$

$0 = 0$ both are equalities so both answers are good solutions.
Elementary Algebra Review

The Elementary Algebra Section of the Accuplacer Computerized Placement Test consists of twelve multiple choice questions, which include the following operations:

Computation (add, subtract, multiply and divide) of:
Integers, rational numbers (positive and negative), absolute values, monomials, and polynomials

Evaluation of algebraic formulas

Factoring polynomials

Simplifying rational roots, exponents, and algebraic fractions

Solving equations, inequalities, and word problems

Solving systems of linear equation and quadratic equations

Linear equations

Translating written phrases into algebraic expressions or equations

Answers to all questions are in a multiple choice format, and you must answer one question before going to the next. Calculators are not permitted, but scrap paper will be provided and must be turned in at the end of the testing session. There is no time limit. Work through these sample questions. Answers are included at the end of this section.

1) On a recent Tuesday in Fairbanks, Alaska, the temperature at 6:00 p.m. was 8° F. By midnight the temperature had fallen 23°, and by 6:00a.m. the following day the temperature had dropped another 4°. By 3:00 p.m., the temperature had risen 24°. What was the temperature at 3:00 p.m. on Wednesday?

   a) 35°
   b) -19°
   c) 5°
   d) -5°

2) Multiply: (x-5)(x-2)

   a) x² -7x - 10
   b) x² -7x + 10
   c) x² +7x -10
   d) 2x-10
3) A rectangular table is 11 feet longer than it is wide. If the perimeter is 42 feet, what is the width?
   a) 462 feet
   b) 53 feet
   c) 31 feet
   d) 5 feet

4) Simplify: \[2x + \sqrt{4x} + \sqrt[3]{12x}\]
   a) \[18x^3\]
   b) \[2x + \sqrt{4x} + \sqrt[3]{12x}\]
   c) \[4x + 2\sqrt[3]{3x}\]
   d) \[4x + 2x^2\sqrt[3]{3}\]

5) If \(x = -2\), then \(x^2 + 2x + 3\) is equal to:
   a) 3
   b) -5
   c) 11
   d) 5

6) The sum of twice a number and 7 is 37. Find the number.
   a) 30
   b) 7
   c) 23
   d) 15

7) \((3, -2)\) is the solution for which linear equation?
   a) \[3x - 2y = 13\]
   b) \[2x + y = 3\]
   c) \[5x + 3y = -7\]
   d) \[4x + 7y = -5\]

8) List these numbers from least to greatest: -5, 2, -2, 0, 4, -1
   a) 0, -1, -2, 2, 4, -5
   b) -5, 4, 2, -2, -1, 0
   c) -5, -2, -1, 0, 2, 4
9) Simplify: \((2 - 4)(6 - 8)(11 - 9)\)
   
   a) 4  
   b) -4  
   c) 8  
   d) -256  

10) Which binomial is a factor of: \(x^2 - 13x + 36\)?
   
   a) \((x + 4)\)  
   b) \((x - 4)\)  
   c) \((x - 13)\)  
   d) \((x + 13)\)  

11) \(\frac{x^2 + 4x + 3}{x^2y} + \frac{x^2 + 2x + 1}{xy^2}\)
    
    a) \(\frac{2x + 3}{xy}\)  
    b) \(\frac{y(x + 3)}{x(y + 1)}\)  
    c) \(xy\)  
    d) \(\frac{xy}{2x + 3}\)  

12) Simplify: \(2x - 3(x - 2)\)
    
    a) \(-x + 6\)  
    b) \(x + 6\)  
    c) \(-1\)  
    d) \(3x - 5\)  

13) Solve: \(x^2 - 5x = 24\)
    
    a) \(-2\) or \(-5\)  
    b) \(5\) or \(2\)  
    c) \(8\) and \(-3\)
d) -8 and 3

14) Solve: \( \sqrt{x} - 2 = 5 \)

   a) 7  
   b) 9  
   c) 3  
   d) 49

15) Solve: \( 4y^2 - 16 = 0 \)

   a) 4 or -4  
   b) 0  
   c) 2 or -2  
   d) 11 or -11
Elementary Algebra Answers and Solutions

1) Answer: c  Solution: The temperature dropped from the starting point, so you must subtract from the original temperature of 8°. 8 − 23 = -15 then -15 − 4 = -19. Then the temperature rose by 24 degrees, so you add 24. -19 + 24 = 5°

2) Answer: b  Solution: You may be familiar with the acronym FOIL, which stands for first, outer, inner, and last. You multiply each of the numbers (letters) by the other numbers (letters.) First terms, x * x = x²  outside terms, (-2) * (x) = -2x  inside terms, (-5) * x = -5x  last terms (-5)(-2) = 10. Then combine any like terms: -2x + (-5x) = -7x  x² - 7x + 10

3) Answer: d  Solution: Begin by defining the unknown. Let x = the width, and let x + 11 = the length. The perimeter of a polygon is the sum off all its sides. For a rectangle this would mean adding the length twice and the width twice and adding those numbers together. The formula is P = 2l + 2w. Since the perimeter is given in the problem, you can substitute in the formula the parts that you know, and solve for the parts that you need to know. 42 = 2(x + 11) + 2(x). Next multiply the 2's by the other numbers/letters in the parentheses: 42 = 2x + 22 + 2x. Then combine the like terms: 42 = 4x + 22. Subtract 22 from each side of the equation: 42-22 = 4x + 22 − 22  leaving 20 = 4x. Then divide both sides of the equation by 4 to isolate x: 5 = x. The width is 5 feet and the length is 11 feet longer or 16 feet.

4) Answer: d  Solution: Begin by taking the square roots of any perfect squares under the radicals. The square root of 4 is 2 and the square root of x² is x, so the middle term becomes 2x. The number 12 can be broken down into 4 * 3. The square root of 4 is 2 and the square root of x^4 is x². The square root of 3 is not a perfect square, so leave it under the radical. Now you have 2x + 2x + 2x²√3. Combine the like terms 2x + 2x, which leaves 4x + 2x²√3.

5) Answer: a  Solution: Given that x = -2, substitute that number in the equation for each x. (-2)^2 + 2(-2) +3. Remember that a negative number multiplied by another negative number results in a positive product, so (-2)(-2) = 4 for the first term. The second term is a positive number multiplied by a negative number which results in a negative product, so 2(-2) = -4. After multiplying, the remaining equation is 4 − 4 + 3. After subtracting 4 from 4, this leaves only 3.

6) Answer: d  Read all word problems carefully, and think about the meaning of the words. Twice means multiplied by 2, and sum is the answer to an addition problem. The terms is and results in usually represent the equal symbol. As in question number 3, begin by assigning a variable to the unknown. Let x = the number. Twice the number would be written as 2x. Add the number 7 to the 2x and write the 37 on the other side of the equals symbol. 2x + 7 = 37 Now that you have the equation, you are ready to solve for x.
Subtract 7 from both sides of the equation: \(2x + 7 - 7 = 37 - 7\). This leaves \(2x = 30\). Next divide both sides of the equation to get \(x\) by itself: \(x = 15\). To check your answer, plug 15 into your original equation. The result should be a true statement. \(2(15) + 7 = 37\). \(37 = 37\) is a true statement.

7) **Answer:** a  Solution: The solution sets for linear equations are written in the form \((x,y)\). To determine the correct solution, substitute each combination of \(x\) and \(y\) into the equation to see which results in a true statement. \(3(3) - 2(-2) = 13\)
\[9 + 4 = 13\]
\[13 = 13\] is a true statement

8) **Answer:** c  It might help to draw a number line on your scrap paper and/or think of the absolute value of the numbers decreasing as they approach zero.

9) **Answer:** c  In solving problems with several steps, begin by completing the operations inside the parentheses first. \((2 - 4)\) results in \((-2)\), \((6 - 8)\) results in \(-2\), and \((11 - 9)\) results in 2. Now there is only multiplication remaining \((-2)(-2)(2)\). After multiplying the contents of the first two parentheses, the result is 4 since multiplying two negatives results in a positive answer. Multiply that 4 by 2 and the result is 8.

10) **Answer:** b  Solution: The answer choices for this question are binomials, one of which is a factor of the trinomial in the original question. First factor the binomial by figuring the square root of the first term and the factors of the last term. The square root of \(x^2\) is \(x\) and the factors of 36 are: \((1\ and\ 36)\) or \((-1\ and\ -36)\) or \((2\ and\ 18)\) or \((-2\ and\ -18)\) or \((3\ and\ 12)\) or \((-3\ and\ -12)\) or \((4\ and\ 9)\) or \((-4\ and\ -9)\). Think about which of these factors would add together to get the middle term \((-13\ in\ this\ problem)\). -4 and -9 is the correct combination. The factored form of the trinomial is written in two sets of parentheses, with the square root of the first term in the first position of each. The second term in each are the factors with the chosen signs. \((x - 4)(x - 9)\). To check the product, use the FOIL method explained in the answer to question #2. Before choosing an answer from the four choices, be certain that you have used the correct sign.

11) **Answer:** b  Solution: This problem involves factoring trinomials, as explained in the answer to question #10. To factor the numerator of the both fractions, take the square root of the first term, and figure out the factors of the last term. For the first fraction, the square root of \(x^2\) is \(x\) and would be written in the first position in both parentheses. The factors of 3 are: 1 and 3. {Note, we do not need to consider the negative factors since there are no negative numbers in this problem.} \((x + 1)(x + 3)\) is now the numerator of the first fraction, and the denominator remains the same. For the second fraction, the square root of \(x^2\) is \(x\), and the factors of 1 are: 1 and 1. \((x + 1)(x + 1)\) is the numerator for the second fraction. Remember that division of fractions is done by multiplying by the reciprocal of the second fraction. Rewrite the problem as a multiplication problem keeping the first fraction the same and writing \(xy^2\) as the numerator of the second fraction and \((x + 1)(x + 1)\) as the denominator of the second fraction. You may cancel any like terms from numerators to denominators. {Note: You may only cancel in multiplication, never in addition or subtraction. You may only cancel from numerators to denominators, never from numerators to numerators or denominators to denominators.}
\[
(x + 3)(x + 1) * \frac{xy^2}{(x + 1)(x + 1)}
\]
\[ x^2y \quad (x + 1)(x + 1) \]

The terms \((x + 1)\) can be divided to leave 1 on the numerator in the first fraction and the in the denominator of the second fraction. The \(x\) terms can be divided leaving \(x\) in the denominator of the first fraction and \(1\) in the numerator of the second fraction. The \(y\) terms can be divided leaving \(1\) in the denominator of the first fraction and \(y\) in the numerator of the second fraction. The result is \(\frac{y(x + 3)}{x(y + 1)}\)

12) **Answer: a**  
**Solution:** This problem involves several operations and cannot be solved, only simplified. Since a number beside the parentheses indicates multiplication, begin by multiplying the negative 3 by both terms inside the parentheses. This results in \(2x - 3x + 6\). Then combine like terms: \(2x - 3x = -1x\), which is usually written as \(-x\).

13) **Answer: c**  
**Solution:** To solve, subtract 24 from both sides of the equation to get: \(x^2 - 5x - 24 = 0\)  
Factor the trinomial following the steps explained in the solutions to questions 10 and 11. The factors of -24 are \((-1 \text{ and } 24)\) or \((-24 \text{ and } 1)\) or \((2 \text{ and } -12)\) or \((-2 \text{ and } 12)\) or \((4 \text{ and } -6)\) or \((-4 \text{ and } 6)\) or \((-3 \text{ and } 8)\) or \((-8 \text{ and } 3)\). Of these choices, adding -8 and 3 results in the middle term (-5). To check this problem, substitute the possible answers in the equation and determine which set results in true statements. \((8)^2 - 5(8) = 24; \quad 64 - 40 = 24; \quad 24 = 24\) is a true statement. \((-3)^2 - 5(-3) = 24; \quad 9 + 15 = 24; \quad 24 = 24\) is true.

14) **Answer: d**  
**Solution:** To solve this problem, first add 2 to both sides of the equation leaving \(\sqrt{x} = 7\). Then square both sides \((\sqrt{x})^2 = (7)^2\)  
This results in \(x = 49\).

15) **Answer c**  
**Solution:** This problem may be solved by factoring or by isolating the variable and taking the square root of both sides. To solve by factoring, first divide everything by 4, leaving \(y^2 - 4 = 0\). This type of the equation is the difference of two squares and is factored by writing the square root of the first term in the first position of the parentheses and writing the square root of the second term in the second position of both parentheses. Write one as an addition and the other as a subtraction. \((y - 2)(y + 2) = 0\). Since the product of these is equal to zero, they may be solved separately. \(y - 2 = 0; \text{ add } 2 \text{ to both sides, and } y = 2\). \(y + 2 = 0; \text{ subtract } 2 \text{ from both sides and } y = -2\).

Another method of solving is to isolate the variable and take the square root of both sides. First add 16 to both sides, resulting in \(4y^2 = 16\). Then divide both sides by 4, leaving \(y^2 = 4\). Take the square root of both sides to determine the final answer. The square root of \(y^2\) is \(y\) and the square root of 4 is either negative or positive 2. (Sometimes written as \(\pm 2\))

**Best wishes for your future in college!**