



# ACCUPLACER

## PLACEMENT TEST

## STUDY GUIDE

FOR MORE INFORMATION CONTACT:

Tutoring & Testing Center  
217-234-5301 or 217-234-5287

5001 Lake Land Boulevard  
Mattoon, IL 61938  
[lakelandcollege.edu](http://lakelandcollege.edu)

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# LAKE LAND COLLEGE PLACEMENT TESTING POLICY

- Students will be mandatorily placed into appropriate courses as determined by scores on the Lake Land College placement test/ACT/SAT test and program requirements.
- Students may retest **once** in each skill area--limit of two sets of Lake Land College test scores within a four-year period.
- Initial placement test is free; minimal retest fee.
- Students with special needs can make special arrangements for placement testing by contacting the Coordinator for Student Accommodations at 217-234-5259.

How well you do may be affected by how well you follow instructions. A short tutorial with sample questions will show you how to take the test. Be sure you understand test instructions before beginning.

Take your time and work at your own speed. **There is no time limit.** Scores are determined by the number of correct answers. It is to your advantage to take your time.

\* Placement in courses is based upon test scores.

\* Placement test scores are part of the selection criteria for special admission programs.

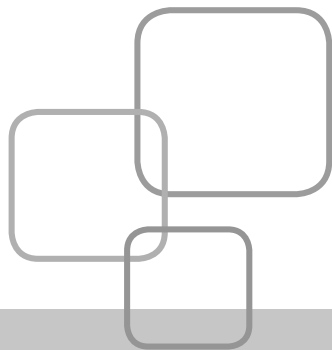
## Skill areas include reading, sentence skills (English) and math:

- The reading test includes passages and/or statements with questions based on the material.
- The sentence skills (English) test requires correction of errors in grammar, usage and punctuation, and rewriting sentences following the directions given.
- The mathematics test covers elementary algebra and college-level math.

## TIPS FOR TAKING ACCUPLACER TESTS

1. Relax! The ACCUPLACER tests are designed to help you succeed in school. Your scores help determine which courses are most appropriate for your current level of knowledge and skills.
2. You will be able to concentrate better on the test if you get plenty of rest and eat properly before the test. Please arrive a few minutes early so you can find the testing area, restrooms, etc. and have time to gather your thoughts before the test begins.
3. Be sure you understand directions before beginning each test.
4. Read each question carefully until you understand what the question is asking. If answering an item requires several steps, be sure you consider them all.
5. Be sure to answer every item. You are not penalized for guessing. Your score will provide more useful placement information if you answer every item, even if you guess.
6. Don't be afraid to change an answer if you believe that your first choice was wrong.
7. If you have a problem or question during the test, raise your hand, and the test proctor will help you. Although they cannot answer test questions for you, they can help you with other issues.

# ACCUPLACER®



## ACCUPLACER® Sample Questions for Students

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## Sentence Skills

In an ACCUPLACER® placement test, there are 20 Sentence Skills questions of two types.

- The first type consists of sentence-correction questions that require an understanding of sentence structure. These questions ask you to choose the most appropriate word or phrase for the underlined portion of the sentence.
- The second type consists of construction-shift questions. These questions ask that a sentence be rewritten according to the criteria shown while maintaining essentially the same meaning as the original sentence.

Within these two primary categories, the questions are also classified according to the skills being tested. Some questions deal with the logic of the sentence, others with whether or not the answer is a complete sentence, and still others with the relationship between coordination and subordination.

## Sentence Skills Sample Questions

### Directions for questions 1–11

Select the best version of the underlined part of the sentence. The first choice is the same as the original sentence. If you think the original sentence is best, choose the first answer.

1. Stamp collecting being a hobby that is sometimes used in the schools to teach economics and social studies.
  - A. being a hobby that is
  - B. is a hobby because it is
  - C. which is a hobby
  - D. is a hobby
2. Knocked sideways, the statue looked as if it would fall.
  - A. Knocked sideways, the statue looked
  - B. The statue was knocked sideways, looked
  - C. The statue looked knocked sideways
  - D. The statue, looking knocked sideways,
3. To walk, biking, and driving are Pat's favorite ways of getting around.
  - A. To walk, biking, and driving
  - B. Walking, biking, and driving
  - C. To walk, biking, and to drive
  - D. To walk, to bike, and also driving
4. When you cross the street in the middle of the block, this is an example of jaywalking.
  - A. When you cross the street in the middle of the block, this
  - B. You cross the street in the middle of the block, this
  - C. Crossing the street in the middle of the block
  - D. The fact that you cross the street in the middle of the block
5. Walking by the corner the other day, a child, I noticed, was watching for the light to change.
  - A. a child, I noticed, was watching
  - B. I noticed a child watching
  - C. a child was watching, I noticed,
  - D. there was, I noticed, a child watching
6. Going back to his old school, everything there looked smaller than Don remembered.
  - A. Going back to his old school,
  - B. When he went back to his old school,
  - C. To go back to his old school,
  - D. As he went back to his old school,
7. Painting, drawing and to sculpt are some of the techniques artists such as Picasso used to express themselves.
  - A. Painting, drawing and to sculpt
  - B. To paint, to draw, and sculpting
  - C. Painting, drawing, and sculpting
  - D. To paint, draw, and sculpting
8. Playing sports in school which is an activity meant to teach teamwork and leadership skills students can use later in life.
  - A. which is an activity
  - B. is an activity because it is
  - C. being an activity which is
  - D. is an activity
9. Glancing at his watch, Daniel picked up his speed.
  - A. Glancing at his watch,
  - B. He glanced at his watch, and
  - C. To glance at his watch,
  - D. He glanced at his watch,
10. For a snake, shedding their skin up to eight times a year is part of a natural process.
  - A. For a snake, shedding their skin
  - B. A snake's shedding its skin
  - C. When a snake sheds its skin
  - D. To shed its skin, for snakes

11. I was surprised by the noise peering through the window to see who was at the door.
- A. I was surprised by the noise peering
  - B. I was surprised by the noise, peered
  - C. The noise surprised me, peering
  - D. Surprised by the noise, I peered

**Directions for questions 12–22**

*Rewrite the sentence in your head following the directions given below. Keep in mind that your new sentence should be well written and should have essentially the same meaning as the original sentence.*

12. It is easy to carry solid objects without spilling them, but the same cannot be said of liquids.

Rewrite, beginning with

Unlike liquids,

The next words will be

- A. it is easy to
  - B. we can easily
  - C. solid objects can easily be
  - D. solid objects are easy to be
13. Although the sandpiper is easily frightened by noise and light, it will bravely resist any force that threatens its nest.

Rewrite, beginning with

The sandpiper is easily frightened by noise and light,

The next words will be

- A. but it will bravely resist
  - B. nevertheless bravely resisting
  - C. and it will bravely resist
  - D. even if bravely resisting
14. If he had enough strength, Todd would move the boulder.

Rewrite, beginning with

Todd cannot move the boulder

The next words will be

- A. when lacking
- B. because he
- C. although there
- D. without enough

15. The band began to play, and then the real party started.

Rewrite, beginning with

The real party started

The next words will be

- A. after the band began
  - B. and the band began
  - C. although the band began
  - D. the band beginning
16. Chris heard no unusual noises when he listened in the park.

Rewrite, beginning with

Listening in the park,

The next words will be

- A. no unusual noises could be heard
  - B. then Chris heard no unusual noises
  - C. and hearing no unusual noises
  - D. Chris heard no unusual noises
17. It is unusual to see owls during the daytime, since they are nocturnal animals.

Rewrite, beginning with

Being nocturnal animals,

The next words will be

- A. it is unusual to see owls
  - B. owls are not usually seen
  - C. owls during the daytime are
  - D. it is during the daytime that
18. If I want your opinion, I will ask for it.

Rewrite, beginning with

I won't ask for your opinion

The next words will be

- A. if I want it
  - B. when I want it
  - C. although I want it
  - D. unless I want it
19. It began to rain, and everyone at the picnic ran to the trees to take shelter.

Rewrite, beginning with

Everyone at the picnic ran to the trees to take shelter

The next words will be

- A. beginning to rain
- B. when it began to rain
- C. although it began to rain
- D. and it began to rain

20. Lucy saw an amazing sight when she witnessed her first sunrise.

Rewrite, beginning with

Witnessing her first sunrise,

The next words will be

- A. an amazing sight was seen
  - B. when Lucy saw an amazing sight
  - C. Lucy saw an amazing sight
  - D. seeing an amazing sight
21. After three hours of walking the museum, the entire family felt in need of a rest.

Rewrite, beginning with

The entire family felt in need of a rest

The next words will be

- A. walking through the museum for three hours
  - B. having walked through the museum for three hours
  - C. and they walked through the museum for three hours
  - D. despite having walked through the museum for three hours
22. The big celebration meal was over, and everyone began to feel sleepy.

Rewrite, beginning with

Everyone began to feel sleepy

The next words will be

- A. and the big celebration meal
- B. before the big celebration meal
- C. after the big celebration meal
- D. although the big celebration meal

## Reading Comprehension

In an ACCUPLACER placement test, there are 20 questions of two primary types in Reading Comprehension.

- The first type of question consists of a reading passage followed by a question based on the text. Both short and long passages are provided. The reading passages can also be classified according to the kind of information processing required, including explicit statements related to the main idea, explicit statements related to a secondary idea, application, and inference.
- The second type of question, sentence relationships, presents two sentences followed by a question about the relationship between these two sentences. The question may ask, for example, if the statement in the second sentence supports that in the first, if it contradicts it, or if it repeats the same information.

## Reading Comprehension Sample Questions

### Directions for questions 1–9

*Read the statement or passage and then choose the best answer to the question. Answer the question based on what is stated or implied in the statement or passage.*

1. In the words of Thomas De Quincey, “It is notorious that the memory strengthens as you lay burdens upon it.” If, like most people, you have trouble recalling the names of those you have just met, try this: The next time you are introduced, plan to remember the names. Say to yourself, “I’ll listen carefully; I’ll repeat each person’s name to be sure I’ve got it, and I will remember.” You’ll discover how effective this technique is and probably recall those names for the rest of your life.

The quotation from De Quincey indicates that the memory

- A. always operates at peak efficiency
- B. breaks down under great strain
- C. improves if it is used often
- D. becomes unreliable if it tires

2. Unemployment was the overriding fact of life when Franklin D. Roosevelt became president of the United States on March 4, 1933. At the time, the government did not systematically collect statistics of joblessness; actually it did not start doing so until 1940. The Bureau of Labor Statistics later estimated that 12,830,000 persons were out of work in 1933, about one-fourth of a civilian labor force of more than 51 million.

Roosevelt signed the Federal Emergency Relief Act on May 12, 1933. The president selected Harry L. Hopkins, who headed the New York relief program, to run FERA. A gifted administrator, Hopkins quickly put the program into high gear. He gathered a small staff in Washington and brought the state relief organizations into the FERA system. While the agency tried to provide all the necessities, food came first. City dwellers usually got an allowance for fuel, and rent for one month was provided in case of eviction.

This passage is primarily about

- A. methods of estimating unemployment rates in the 1930s
  - B. the effect of unemployment on United States families
  - C. President Franklin D. Roosevelt's presidency
  - D. the creation of President Roosevelt's FERA program
3. With varying success, many women around the world today struggle for equal rights. Historically, women have achieved greater equality with men during periods of social adversity. The following factors initiated the greatest number of improvements for women: violent revolution, world war, and the rigors of pioneering in an undeveloped land. In all three cases, the essential element that improved the status of women was a shortage of men, which required women to perform many of society's vital tasks.

We can conclude from the information in this passage that

- A. women today are highly successful in winning equal rights
  - B. only pioneer women have been considered equal to men
  - C. historically, women have only achieved equality through force
  - D. historically, the principle of equality alone has not been enough to secure women equal rights
4. All water molecules form six-sided structures as they freeze and become snow crystals. The shape of a snow crystal is determined by temperature, vapor, and wind conditions in the upper atmosphere. A snow crystal is always symmetrical because these conditions affect all six of its sides simultaneously.

The purpose of the passage is to present

- A. a personal observation
- B. a solution to a problem
- C. factual information
- D. opposing scientific theories

5. In the words of Thomas De Quincey, "It is notorious that the memory strengthens as you lay burdens upon it." If, like most people, you have trouble recalling the names of those you have just met, try this: The next time you are introduced, plan to remember the names. Say to yourself, "I'll listen carefully; I'll repeat each person's name to be sure I have it, and I will remember." You'll discover how effective this technique is and probably recall those names for the rest of your life.

The passage suggests that people remember names best when they

- A. meet new people
  - B. are intelligent
  - C. decide to do so
  - D. are interested in people
6. Many people have owned, or have heard of, traditional "piggy banks," coin banks shaped like pigs. A logical theory about how this tradition started might be that because pigs often symbolize greed, the object is to "fatten" one's piggy bank with as much money as possible.

However, while this idea makes sense, it is not the correct origin of the term. The genesis of the piggy bank is the old English word "pygg," which was a common kind of clay hundreds of years ago in England. People used pots and jars made out of this red "pygg" clay for many different purposes in their homes. Sometimes they kept their money in one of the pots, and this was known as a pygg bank. Over the years, because "pygg" and "pig" sounded the same, glaziers began making novelty banks out of pottery in the shape of a pig as a kind of joke. These banks were given as gifts and exported to countries where people spoke other languages and where no one had ever heard of pygg clay. The tradition caught on all over the world, and today piggy banks come in all colors and are made of all kinds of materials, including plastic.

This passage is mainly about how

- A. people in different countries save their money
  - B. people in England made pottery centuries ago
  - C. a common term originated in a surprising way
  - D. an unusual custom got started
7. The wheel is considered one of the most important mechanical inventions of all time. Many technologies since the invention of the wheel have been based on its principles, and since the industrial revolution, the wheel has been a basic element of nearly every machine constructed by humankind. No one knows the exact time and place of the invention of the wheel, but its beginnings can be seen across many ancient civilizations.

The passage suggests that the wheel is an important invention because it

- A. is one of the world's oldest inventions
- B. forms the basis of so many later inventions
- C. can be traced to many ancient cultures
- D. is one the world's most famous inventions

8. Samuel Morse, best known today as the inventor of Morse Code and one of the inventors of the telegraph, was originally a prominent painter. While he was always interested in technology and studied electrical engineering in college, Morse went to Paris to learn from famous artists of his day and later painted many pictures that now hang in museums, including a portrait of former President John Adams. In 1825, Morse was in Washington, D.C., painting a portrait of the Marquis de Lafayette when a messenger arrived on horseback to tell him that his wife was gravely ill back at his home in Connecticut. The message had taken several days to reach him because of the distance. Morse rushed to his home as fast as he could, but his wife had already passed away by the time he arrived. Grief-stricken, he gave up painting and devoted the rest of his life to finding ways to transmit messages over long distances faster.

Morse left the art world and helped to invent the telegraph because he

- A. was tired of painting
  - B. wanted to communicate with people far away
  - C. experienced a personal tragedy in his life
  - D. was fascinated by science
9. Leonardo da Vinci is not only one of the most famous artists in history, but he was also a botanist, a writer, and an inventor. Even though most of his inventions were not actually built in his lifetime, many of today's modern machines can be traced back to some of his original designs. The parachute, the military tank, the bicycle, and even the airplane were foretold in the imaginative drawings that can still be seen in the fragments of da Vinci's notebooks. Over 500 years ago, this man conceived ideas that were far ahead of his time.

The author of this passage is praising da Vinci primarily for his

- A. artistic talent
- B. intelligence
- C. foresight
- D. fame

### Directions for questions 10–18

*For the questions that follow, two underlined sentences are followed by a question or statement. Read the sentences, then choose the best answer to the question or the best completion of the statement.*

10. The Midwest is experiencing its worst drought in 15 years.

Corn and soybean prices are expected to be very high this year.

What does the second sentence do?

- A. It restates the idea found in the first.
- B. It states an effect.
- C. It gives an example.
- D. It analyzes the statement made in the first.

11. Social studies classes focus on the complexity of our social environment.

The subject combines the study of history and the social sciences and promotes skills in citizenship.

What does the second sentence do?

- A. It expands on the first sentence.
- B. It makes a contrast.
- C. It proposes a solution.
- D. It states an effect.

12. Knowledge of another language fosters greater awareness of cultural diversity among the peoples of the world.

Individuals who have foreign language skills can appreciate more readily other peoples' values and ways of life.

How are the two sentences related?

- A. They contradict each other.
- B. They present problems and solutions.
- C. They establish a contrast.
- D. They repeat the same idea.

13. While most people think of dogs as pets, some dogs are bred and trained specifically for certain types of work.

The bloodhound's acute sense of smell and willing personality make it ideal for tracking lost objects or people.

What does the second sentence do?

- A. It makes a contrast.
- B. It restates an idea found in the first.
- C. It states an effect.
- D. It gives an example.

14. Paris, France, is a city that has long been known as a center of artistic and cultural expression.

In the 1920s, Paris was home to many famous artists and writers from around the world, such as Picasso and Hemingway.

What does the second sentence do?

- A. It reinforces the first.
- B. It states an effect.
- C. It draws a conclusion.
- D. It provides a contrast.

15. Studies show that the prevalence of fast-food restaurants corresponds with the rates of obesity in both children and adults.

Obesity is now on the rise in countries where fast-food restaurants are becoming more common.

How do the two sentences relate?

- A. They express roughly the same idea.
- B. They contradict each other.
- C. They present problems and solutions.
- D. They establish a contrast.



16. Compared with the rest of the country, North Dakota has a thriving economy, making it a place where more people want to live.

With temperatures in January ranging from 2 to 17 degrees Fahrenheit, winters in North Dakota are viewed by some prospective residents as inhospitable.

What does the second sentence do?

- A. It reinforces the first.
  - B. It explains what is stated in the first.
  - C. It contradicts the first.
  - D. It analyzes a statement made in the first.
17. Some stores are testing a new checkout system that allows shoppers to use their mobile phones to scan items as they walk through stores and pay at self-service kiosks, skipping the cashiers' lines.

The new mobile checkout system reduces long lines and customer wait times in stores.

What does the second sentence do?

- A. It expands on the first.
  - B. It states an effect.
  - C. It contrasts with the first.
  - D. It gives an example.
18. According to the American Sleep Disorders Association, the average teenager needs around 9.5 hours of sleep per night, possibly because critical growth hormones are released during sleep.

The average adult requires between six and eight hours of sleep per night for optimal health and productivity.

How do the two sentences relate?

- A. They establish a contrast.
- B. They contradict each other.
- C. They reinforce each other.
- D. They provide a problem and solution.

## WritePlacer®

This test measures your ability to write effectively, which is critical to academic success.

Your writing sample will be scored on the basis of how effectively it communicates a whole message to the readers for the stated purpose. Your score will be based on your ability to express, organize and support your opinions and ideas, not the position you take on the essay topic. The following five characteristics of writing will be considered:

- Focus — The clarity with which you maintain your main idea or point of view
- Organization — The clarity with which you structure your response and present a logical sequence of ideas
- Development and Support — The extent to which you elaborate on your ideas and the extent to which you present supporting details
- Sentence Structure — The effectiveness of your sentence structure
- Mechanical Conventions — The extent to which your writing is free of errors in usage and mechanics

## WritePlacer Sample Topic

*Prepare a multiple-paragraph writing sample of about 300–600 words on the topic below. You should use the time available to plan, write, review and edit what you have written. Read the assignment carefully before you begin to write.*

Some schools require each student to participate in an organized school sport chosen by the student. People at these schools argue that athletics is an important part of the educational experience and that there should be a rule requiring participation. Others argue that students should be free to decide whether or not they wish to participate in organized school sports. Write an essay for a classroom instructor in which you take a position on whether participation in organized school athletics should be required. Be sure to defend your position with logical arguments and appropriate examples. Your essay must be 300–600 words in length.

## Elementary Algebra

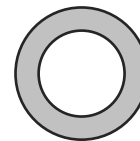
There are 12 questions administered on the Elementary Algebra test, divided into the following content areas:

- Numbers and quantities. Topics include integers and rational numbers, computation with integers and negative rationals, absolute value, and ordering.
- Algebraic expressions. Topics include evaluation of simple formulas and expressions, adding and subtracting monomials and polynomials, multiplying and dividing monomials and polynomials, evaluating positive rational roots and exponents, simplifying algebraic fractions, and factoring.
- Problem solving. Topics include translating written phrases into algebraic expressions, solving linear equations and inequalities, quadratic equations (by factoring), and verbal problems presented in an algebraic context.

## Elementary Algebra Sample Questions

For each of the questions below, choose the best answer from the four choices given. You may use the paper you received as scratch paper.

1. If  $A$  represents the number of apples purchased at 15 cents each, and  $B$  represents the number of bananas purchased at 10 cents each, which of the following represents the total value of the purchases in cents?
  - A.  $A + B$
  - B.  $25(A + B)$
  - C.  $10A + 15B$
  - D.  $15A + 10B$
2.  $\sqrt{2} \times \sqrt{15} = ?$ 
  - A.  $\sqrt{17}$
  - B.  $\sqrt{30}$
  - C. 17
  - D. 30
3. What is the value of the expression  $2x^2 + 3xy - 4y^2$  when  $x = 2$  and  $y = -4$ ?
  - A. -80
  - B. -32
  - C. 32
  - D. 80
4. In the figure below, both circles have the same center, and the radius of the larger circle is  $R$ . If the radius of the smaller circle is 3 units less than  $R$ , which of the following represents the area of the shaded region?



- A.  $\pi R^2$
  - B.  $\pi(R - 3)^2$
  - C.  $\pi R^2 - \pi \times 3^2$
  - D.  $\pi R^2 - \pi(R - 3)^2$
5.  $(3x - 2y)^2 =$ 
    - A.  $9x^2 - 4y^2$
    - B.  $9x^2 + 4y^2$
    - C.  $9x^2 - 6xy + 4y^2$
    - D.  $9x^2 - 12xy + 4y^2$

6. If  $x > 2$ , then  $\frac{x^2 - x - 6}{x^2 - 4} =$

- A.  $\frac{x-3}{2}$
- B.  $\frac{x-3}{x-2}$
- C.  $\frac{x-3}{x+2}$
- D.  $\frac{3}{2}$

7.  $\frac{4 - (-6)}{-5} =$

- A. -2
- B.  $-\frac{2}{5}$
- C.  $\frac{2}{5}$
- D. 2

8. If  $2x - 3(x + 4) = -5$ , then  $x =$

- A. -17
- B. -7
- C. 7
- D. 17

9.  $-3(5 - 6) - 4(2 - 3) =$

- A. -7
- B. -1
- C. 1
- D. 7

10.  $20 - \frac{4}{5}x \geq 16$

Which of the following inequalities is equivalent to the inequality shown above?

- A.  $x \leq 5$
- B.  $x \geq 5$
- C.  $x \leq \frac{65}{2}$
- D.  $x \geq \frac{65}{2}$

11. Which of the following lists of numbers is ordered from least to greatest?

- A.  $-\frac{1}{3}, -\frac{3}{5}, \frac{2}{3}, \frac{3}{5}$
- B.  $-\frac{3}{5}, -\frac{1}{3}, \frac{3}{5}, \frac{2}{3}$
- C.  $-\frac{1}{3}, -\frac{3}{5}, \frac{3}{5}, \frac{2}{3}$
- D.  $-\frac{3}{5}, -\frac{1}{3}, \frac{2}{3}, \frac{3}{5}$

12. If  $5t + 2 = 6$ , then  $t =$

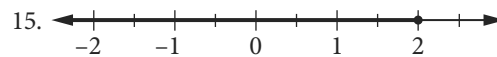
- A. 8
- B.  $\frac{5}{4}$
- C.  $\frac{4}{5}$
- D. -8

13. For which of the following equations are  $x = 5$  and  $x = -5$  both solutions?

- A.  $x^2 + 25 = 0$
- B.  $x^2 - 25 = 0$
- C.  $x^2 + 10x - 25 = 0$
- D.  $x^2 - 5x - 25 = 0$

14. If  $x \neq 0$ , then  $\frac{u}{x} + \frac{5u}{x} - \frac{u}{5x} =$

- A.  $\frac{7x}{5u}$
- B.  $\frac{5u}{7x}$
- C.  $\frac{29u}{5x}$
- D.  $\frac{31u}{5x}$



The solution set of which of the following inequalities is graphed on the number line above?

- A.  $2x - 4 \geq -3$
- B.  $2x + 5 \leq 6$
- C.  $3x - 1 \leq 5$
- D.  $4x - 1 \geq 7$

16.  $2x + 6y = 5$   
 $x + 3y = 2$

How many solutions  $(x, y)$  are there to the system of equations above?

- A. None
- B. One
- C. Two
- D. More than two

17. Which of the following is a factor of both  $x^2 - x - 6$  and  $x^2 - 5x + 6$ ?

- A.  $x - 3$
- B.  $x - 2$
- C.  $x + 2$
- D.  $x + 3$

## College-Level Mathematics

There are 20 questions administered on the College-Level Mathematics test, divided into the following content areas:

- Algebraic operations. Topics include simplifying rational algebraic expressions, factoring and expanding polynomials, and manipulating roots and exponents.
- Solutions of equations and inequalities. Topics include solving linear and quadratic equations and inequalities, systems of equations and other algebraic equations.
- Coordinate geometry. Topics include plane geometry, the coordinate plane, straight lines, conics, sets of points in the plane, and algebraic function graphs.
- Functions. Topics include polynomial, algebraic, exponential, and logarithmic functions.
- Trigonometry. Topics include trigonometric functions.
- Applications and other topics. Topics include complex numbers, series and sequences, determinants, permutations and combinations, factorials, and word problems.

## College-Level Mathematics Sample Questions

*For each of the questions below, choose the best answer from the five choices given. You may use the paper you received as scratch paper.*

1.  $2^{\frac{5}{2}} - 2^{\frac{3}{2}} =$ 
  - A.  $2^{\frac{1}{2}}$
  - B. 2
  - C.  $2^{\frac{3}{2}}$
  - D.  $2^{\frac{5}{3}}$
  - E.  $2^2$

18.  $\frac{10x^6 + 8x^4}{2x^2} =$

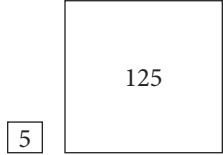
- A.  $9x^{12}$
- B.  $14x^4$
- C.  $5x^4 + 4x^2$
- D.  $5x^3 + 2x^2$

19. A rectangular yard has area 96 square feet. If the width of the yard is 4 feet less than the length, what is the perimeter, in feet, of the yard?

- A. 40
- B. 44
- C. 48
- D. 52

20. On Monday, it took Helen 3 hours to do a page of science homework exercises. The next day she did the same number of exercises in 2 hours. If her average rate on Monday was  $p$  exercises per hour, what was her average rate the next day, in terms of  $p$ ?

- A.  $2(p + 1)$  exercises per hour
- B.  $3(p - 1)$  exercises per hour
- C.  $\frac{2}{3}p$  exercises per hour
- D.  $\frac{3}{2}p$  exercises per hour

2. If  $a \neq b$  and  $\frac{1}{x} + \frac{1}{a} = \frac{1}{b}$ , then  $x =$
- $\frac{1}{b} - \frac{1}{a}$
  - $b - a$
  - $\frac{1}{ab}$
  - $\frac{a-b}{ab}$
  - $\frac{ab}{a-b}$
3. If  $3x^2 - 2x + 7 = 0$ , then  $(x - \frac{1}{3})^2 =$
- $\frac{20}{9}$
  - $\frac{7}{9}$
  - $-\frac{7}{9}$
  - $-\frac{8}{9}$
  - $-\frac{20}{9}$
4. The graph of which of the following equations is a straight line parallel to the graph of  $y = 2x$ ?
- $4x - y = 4$
  - $2x - 2y = 2$
  - $2x - y = 4$
  - $2x + y = 2$
  - $x - 2y = 4$
5. An equation of the line that contains the origin and the point  $(1, 2)$  is
- $y = 2x$
  - $2y = x$
  - $y = x - 1$
  - $y = 2x + 1$
  - $\frac{y}{2} = x - 1$
6. An apartment building contains 12 units consisting of one- and two-bedroom apartments that rent for \$360 and \$450 per month, respectively. When all units are rented, the total monthly rental is \$4,950. What is the number of two-bedroom apartments?
- 3
  - 4
  - 5
  - 6
  - 7
7. If the two square regions in the figures below have the respective areas indicated in square yards, how many yards of fencing are needed to enclose the two regions? (Assume the regions are fenced separately.)
- 
8. If  $\log_{10} x = 3$ , then  $x =$
- $3^{10}$
  - 1,000
  - 30
  - $\frac{10}{3}$
  - $\frac{3}{10}$
9. If  $f(x) = 2x + 1$  and  $g(x) = \frac{x-1}{2}$ , then  $f(g(x)) =$
- $x$
  - $\frac{x-1}{4x+2}$
  - $\frac{4x+2}{x-1}$
  - $\frac{5x+1}{2}$
  - $\frac{(2x+1)(x-1)}{2}$
10. If  $\theta$  is an acute angle and  $\sin \theta = \frac{1}{2}$ , then  $\cos \theta =$
- 1
  - 0
  - $\frac{1}{2}$
  - $\frac{\sqrt{3}}{2}$
  - 2
11.  $5y(2y - 3) + (2y - 3) =$
- $(5y + 1)(2y + 3)$
  - $(5y + 1)(2y - 3)$
  - $(5y - 1)(2y + 3)$
  - $(5y - 1)(2y - 3)$
  - $10y(2y - 3)$

12. For what real numbers  $x$  is the value of  $x^2 - 6x + 9$  negative?

- A.  $-3 < x < 3$
- B.  $x < -3$  or  $x > 3$
- C.  $x = -3$  or  $x = 3$
- D.  $0 < x < 6$
- E. For no real numbers  $x$

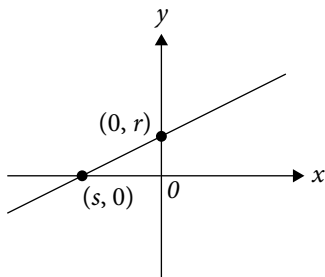
13. A root of  $x^2 - 5x - 1 = 0$  is

- A.  $\frac{1 - \sqrt{29}}{2}$
- B.  $\frac{5 - \sqrt{17}}{2}$
- C.  $\frac{1 + \sqrt{29}}{2}$
- D.  $\frac{5 + \sqrt{17}}{2}$
- E.  $\frac{5 + \sqrt{29}}{2}$

14. In the  $xy$ -plane, the graph of  $y = x^2$  and the circle with center  $(0, 1)$  and radius 3 have how many points of intersection?

- A. None
- B. One
- C. Two
- D. Three
- E. More than three

15.



If an equation of the linear function in the figure above is  $y = mx + b$ , then  $m =$

- A.  $-\frac{r}{s}$
- B.  $\frac{r}{s}$
- C.  $rs$
- D.  $r$
- E.  $-s$

16. One ordering of the letters  $T, U, V,$  and  $W$  from left to right is  $UTVW$ . What is the total number of orderings of these letters from left to right, including  $UTVW$ ?

- A. 8
- B. 12
- C. 16
- D. 20
- E. 24

17. If  $f(x) = \frac{3x-1}{2}$  and  $f^{-1}$  is the inverse of  $f$ , what is the value of  $f^{-1}(3)$ ?

- A.  $\frac{1}{3}$
- B.  $\frac{2}{3}$
- C. 1
- D. 2
- E.  $\frac{7}{3}$

18. The sequence  $\{a_n\}$  is defined by  $a_0 = 1$  and  $a_{n+1} = 2a_n + 2$  for  $n = 0, 1, 2, \dots$ . What is the value of  $a_3$ ?

- A. 8
- B. 10
- C. 16
- D. 20
- E. 22

19. From 5 employees at a company, a group of 3 employees will be chosen to work on a project. How many different groups of 3 employees can be chosen?

- A. 3
- B. 5
- C. 6
- D. 10
- E. 15

20. If  $f(x) = \left(\frac{1}{3}\right)^x$  and  $a < b$ , which of the following must be true?

- A.  $f(a) + f(b) = 3$
- B.  $f(a) + \frac{1}{3} = f(b)$
- C.  $f(a) = f(b)$
- D.  $f(a) < f(b)$
- E.  $f(a) > f(b)$

# Answer Sheet

SENTENCE SKILLS	
Question #	Correct Answer
1	D
2	A
3	B
4	C
5	B
6	B
7	C
8	D
9	A
10	B
11	D
12	C
13	A
14	B
15	A
16	D
17	B
18	D
19	B
20	C
21	B
22	C

READING COMPREHENSION	
Question #	Correct Answer
1	C
2	D
3	D
4	C
5	C
6	C
7	B
8	C
9	C
10	B
11	A
12	D
13	D
14	A
15	A
16	C
17	B
18	A

ELEMENTARY ALGEBRA	
Question #	Correct Answer
1	D
2	B
3	A
4	D
5	D
6	B
7	A
8	B
9	D
10	A
11	B
12	C
13	B
14	C
15	C
16	A
17	A
18	C
19	A
20	D

COLLEGE-LEVEL MATH	
Question #	Correct Answer
1	C
2	E
3	E
4	C
5	A
6	E
7	C
8	B
9	A
10	D
11	B
12	E
13	E
14	C
15	A
16	E
17	E
18	E
19	D
20	E