English Language for Academic Purposes (EAP)

- EAP Reading Skills
- EAP Sentence Meaning
- EAP Listening
- EAP Writing

Testing Center
Educational Services Building Room 108

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Placement Testing Hours
Monday: 9:00 a.m. or 1:00 p.m.
Tuesday: 3:00 p.m.
Wednesday: 3:00 p.m.
Thursday: 9:00 a.m. or 1:00 p.m.
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# About the English Language for Academic Purposes (EAP) Tests

Thank you for choosing to pursue your academic, professional, and personal goals here at North Hennepin Community College (NHCC). Please read the following information to help you review for the placement tests.

When students go to college in the U.S., students take placement tests. The purpose of these tests is for class placement. It is important to try to do your best on these tests. The EAP placement tests measure a student’s skills in these areas: reading, writing, listening, and vocabulary. The tests place non-native English speakers into EAP courses at NHCC. All courses in the EAP program are designed to help students succeed in the United States’ higher education system. The Testing Advisor will discuss test results and course placements with students after the placement test.

The contents of this packet are not intended to be exhaustive or to suggest what will be on the test. Rather, this packet is meant to guide your review of reading, writing, listening, grammar, vocabulary, and math. Take advantage of the resources outlined and invest the time you need to assure appropriate course placement.

We wish you success in all your endeavors here at North Hennepin Community College.

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## Testing Center Staff

## Placement

Course placement in Reading, Listening, Vocabulary, Writing, or Math courses will be at either developmental or college-level. Courses numbered below 1000 are developmental courses designed to prepare students for success in college-level courses. Developmental credits do not apply toward a certificate, diploma, or degree. Courses numbered 1000 or above are considered college-level that meet college-level standards. College credits apply toward the requirements of a certificate, diploma, or degree.

## Guidelines

Students must register for courses according to their placement or for a lower course, but not for a higher course. Students may retest only once a semester for a $10 fee. Students must complete each course with a “C” or better before moving to the next level.

Results for the placement test will be available upon completing the test. The Testing Advisor will explain test results, course placements, the retesting policy, and the next steps in the enrollment process. Information about Online Orientation will be provided following the placement test, and students can schedule the Registration Session once a score is received for the writing placement test. Students will register for courses during their Registration Session.

## Placement Test Waiver

You may be eligible for a placement test waiver if you have previously completed college-level course work. Please contact the Testing Center with questions about eligibility for a placement test waiver.
General Test & Review Information

How to take the placement test

- First apply to the college – [www.nhcc.edu/admissions](http://www.nhcc.edu/admissions) or in person at the Student Info Desk.
- Schedule an appointment to take the placement test. **Call 763-424-0928 to schedule an appointment.** Monday 9:00 or 1:00, Tuesday 3:00, Wednesday 3:00, Thursday 9:00 or 1:00.
- Review! Use this study packet and other recommended resources listed below.
- Show up! Bring **photo identification** (passport, state ID, driver’s license) to your appointment. We cannot allow students to test without identification. Arrive at least 15 minutes early to check-in for your appointment. You will have one hour to write the essay. The other tests are not timed. However, you should assume that it will take approximately two hours to complete the computerized test.

Preparing for the Placement Tests

We strongly recommend that you review for the tests, so that your results reflect your true ability. Here are a few websites to help you review.

- **Accuplacer Study App** – Create an account and log in to take “ESL Practice Tests”. Practice the ESL Reading, ESL Listening, and ESL Sentence Meaning tests. Select “Learn as You Go” to show the correct answer and receive rationale for the answer to each question. [https://accuplacerpractice.collegeboard.org/login](https://accuplacerpractice.collegeboard.org/login)
- **Union Test Prep** – Practice the Accuplacer tests for ESL Reading, ESL Sentence Meaning, and three levels of math. [https://uniontestprep.com/accuplacer-test/practice-test](https://uniontestprep.com/accuplacer-test/practice-test)
- **PETT** – Practice ESOL Listening tests [https://www.seminolestate.edu/adult-ed/els/pett/](https://www.seminolestate.edu/adult-ed/els/pett/)
- **EAP Grammar** – Practice grammar exercises at [www.englishpage.com](http://www.englishpage.com)

Additional Math resources

- **Accuplacer Study App** – Create an account and log in to take “Classic Practice Tests”. Practice Arithmetic, Elementary Algebra, College Math, use both “Learn as You Go” and “Sample Test”. [https://accuplacerpractice.collegeboard.org/login](https://accuplacerpractice.collegeboard.org/login)
- **Khan Academy** – Resources with video tutorials of math topics. [http://www.khanacademy.org](http://www.khanacademy.org)
- **IXL** – Review Algebra 1, Algebra 2, Geometry, and Precalculus. [https://www.ixl.com/math/](https://www.ixl.com/math/)
- **ARCC Math Videos** – Tutorials for different topics on the Math placement test. [https://www.anokaramsey.edu/resources/tutoring-services/tutoring-services/msc-video-modules/](https://www.anokaramsey.edu/resources/tutoring-services/tutoring-services/msc-video-modules/)
EAP READING TEST

Purpose: The Accuplacer EAP Reading Test measures a student’s understanding of what they have read.

Length: 20 questions

Format: Multiple choice

You will read short passages of 50 to 90 words. Half of this test contains comprehension questions (paraphrase, locating information, vocabulary on a phrase level, and pronoun reference). The other half assesses inference skills (main idea, fact vs. opinion, cause/effect logic, identifying irrelevant information, author’s point of view and applying the author’s logic to another situation).

Helpful tip: During the test, take the time to read each passage and the questions again before choosing your answer.

Practice test and review websites: Take the reading practice test below. The answers are at the end of the test. Try more practice tests at:

- https://accuplacerpractice.collegeboard.org/login
- https://uniontestprep.com/accuplacer-test/practice-test/esl-reading-skills/pages/1

Review websites: Use these resources for helpful study guides and tips.

EAP Reading Skills Sample Questions

Read the information below, then choose the best answer.

1. Television has been introduced to almost every country in the world, reaching a large number of viewers on every continent. About 600 million people saw the first person walk on the moon, and a billion people watched the twentieth Olympic Games. Television has in many ways promoted understanding and cooperation among people. It does this by showing educational and cultural programs.

From this passage, a reader can most reasonably conclude that the author believes that

A. people spend too much time watching television
B. not every country needs to have television
C. television can unify people from around the world
D. television is as important as schools

2. People have different ways of learning. Some are better at making mental pictures of new ideas. Others are more comfortable with writing lists of things to memorize. Certain people can learn best when listening to music, while others need silence to concentrate.

Which of the following is the main idea of the passage?

A. Mental pictures help many to learn.
B. Some people prefer lists to making mental pictures.
C. To learn well you need to be comfortable.
D. Different individuals have different ways of acquiring information.

3. If you hold a piece of copper wire over the flame of a wooden match, heat will be conducted by the copper wire to your fingers, and you will be forced to drop the wire. You will, however, still be able to hold the match because wood is a poor conductor of heat.

Which of the following is implied in the passage above?

A. Copper is a good conductor of heat.
B. Wood and copper conduct heat equally.
C. Wood is an excellent conductor of heat.
D. Matches should be made of copper.
4. Many people own different pets. Dogs, cats, birds, and fish are common household pets. Others pets are considered to be exotic animals. These include snakes, lizards, and hedgehogs.

According to the passage, snakes are

A. uncommon pets
B. likely to be found in a household with dogs
C. found only in zoos
D. not allowed in people’s homes

5. Cesar Chavez was an influential leader for farmworkers. He fought for their rights and better working conditions. Chavez led many strikes that angered farm owners. Eventually he succeeded in getting increased wages and better living situations for farmworkers.

The passage indicates that Chavez changed lives by

A. helping to end the farmworkers’ strikes
B. fighting for the rights of farm owners
C. working on the farms every day
D. improving the conditions for farmworkers

6. When cartoonist Charles M. Schulz was a boy in elementary school, other boys teased him for being small and not very good at sports, and his art teacher told him he had no talent for drawing. He had few friends and was too shy to talk to a red-haired girl he admired. Later in life, Schulz used his childhood experiences in his comic strip *Peanuts*: the strip’s main character, the sad and lonely Charlie Brown, represents Schulz as a little boy. *Peanuts* was unique at the time because it contained no adult characters. Readers fell in love with Charlie Brown, and *Peanuts* eventually became one of the most popular comic strips of all time.

What is the main idea of the passage?

A. Peanuts was the world’s most widely read comic strip.
B. Schulz was a very famous cartoonist.
C. Schulz turned the pain of his youth into success as an adult.
D. The comic strip Peanuts featured children as its only characters.
7. Money has been used for thousands of years in nearly every culture as a means of exchange. However, today, the use of cash is becoming less and less common in modern societies all over the world. Every year, a higher percentage of purchases are made online, and even in stores customers are now using credit cards more often than cash. Many people today do all of their banking on the Internet rather than going to the bank in person.

The author of the passage probably assumes that

A. cash will become virtually obsolete in the near future
B. using cash will become popular again
C. paying with credit cards all the time is dangerous
D. societies that do business online will struggle

8. Before giving first aid to an accident victim, you should obtain his or her consent. Asking for consent takes a simple question. Say to the victim, “I know first aid, and I can help until an ambulance arrives. Is that okay?”

According to the passage, it is wrong to

A. use first aid on an accident victim without medical training
B. attempt to help an accident victim without permission
C. help a victim before an ambulance arrives
D. call for an ambulance instead of helping the victim

9. Dr. Ellen Ochoa is an inventor and is also the first female Hispanic astronaut. Her inventions include technology to help robots inspect equipment in space to maintain safety and quality control on spacecraft. Before retiring, she logged more than 1,000 hours in space across several space missions.

According to the passage, Dr. Ochoa is the first

A. Hispanic person to travel into space
B. inventor to travel into space
C. woman to travel into space
D. Hispanic woman to travel into space
10. Dogs and cats make very different types of pets. Before deciding whether to buy or adopt a
dog or a cat, prospective owners need to carefully consider their own lifestyles and
personalities. Dogs may make more affectionate companions, but they require more care and
attention. They must be taken out several times a day and should not be left alone for more
than a few hours. Larger dogs require significant exercise to remain fit and healthy. Cats are
usually more independent in nature and interact less with their owners. Also, a cat can be left
on its own all day, or even for several days, as long as it has food and clean water to drink.

From this passage, a reader can conclude that

A. owning a cat requires less work than owning a dog
B. people who are away from home during the day should not own a cat
C. people who like to play with their pets should own a cat
D. owning a cat is more responsibility than owning a dog

EAP Reading Skills Answer Key

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Notes
SENTENCE MEANING (VOCABULARY) TEST

Purpose: The Accuplacer EAP Sentence Meaning Test measures how well you understand the meaning of sentences in English.

Length: 20 questions

Format: Multiple choice

The Sentence Meaning test measures your understanding of word meanings in one- or two-sentence contexts. The sentences are taken from the subject areas of natural science, history/social studies, arts/humanities, psychology/human relations, and practical situations.

There are four content areas measured: (a) Particle, Phrasal Verbs, Prepositions of Direction; (b) Adverbs, Adjectives, Connectives Sequence; (c) Basic Nouns and Verbs; and (d) Basic and Important Idioms.

Helpful tip: During the test, take the time to read each sentence and the questions again before choosing your answer.

Practice tests: Take the sentence meaning practice test. The answers are at the end of the test. Additional online practice tests are listed below:

- [https://accuplacerpractice.collegeboard.org/login](https://accuplacerpractice.collegeboard.org/login)
- [http://www.examenglish.com/TOEFL/toefl_structure_1.htm](http://www.examenglish.com/TOEFL/toefl_structure_1.htm)
- [http://www.examenglish.com/TOEFL/toefl_structure_2.htm](http://www.examenglish.com/TOEFL/toefl_structure_2.htm)

Grammar review websites: Use these resources for helpful study guides and tips.

EAP Sentence Meaning Sample Questions

Directions for questions 1–8:

The sentence below has a blank space. Choose the word or phrase that makes the sentence meaningful and correct.

1. Shikibu Murasaki, who wrote almost a thousand years ago, was one of the world’s ______ novelists.
   A. most early
   B. too early
   C. more early
   D. earliest

2. The Chang children _____ their parents by making sandwiches for the whole family.
   A. helped out
   B. helped with
   C. helps for
   D. helps to

3. As demonstrated by his last album, which was released after his death, Ibrahim Ferrer _____ one of the most beautiful voices in Latin music.
   A. had
   B. have
   C. have had
   D. having

4. After we saw the play, we had different opinions _____ Vincent’s performance.
   A. about
   B. at
   C. for
   D. to
5. Having recorded many of the most beloved songs of the 1940’s, jazz singer Ella Fitzgerald ____ one of the most prominent musical performers of her time.

   A. had been  
   B. has been  
   C. was  
   D. will be

6. As we drove through the darkness, we saw another car coming _____ the bend in the road.

   A. through  
   B. under  
   C. over  
   D. around

7. Sonia is so determined and stubborn that she never _____ until she gets exactly what she wants.

   A. gives up  
   B. gives out  
   C. gave in  
   D. gave away

8. At only 43, John F. Kennedy was the _____ American president ever to be elected.

   A. most young  
   B. more young  
   C. youngest  
   D. younger
Directions for questions 9–15:

Each problem contains one or two sentences followed by a question. Choose the correct answer to the question.

9. Elena found a tomato that was much bigger than all the others in the garden.
   How did the tomato compare to the others in the garden?
   A. It was the smallest.
   B. It was not very large.
   C. It was larger than some.
   D. It was the largest.

10. When the popular entertainer canceled her appearance, the Latin American festival was postponed indefinitely.
    When will the festival likely take place?
    A. Tonight
    B. Tomorrow
    C. Next week
    D. Many weeks later

11. Jasmine is never late to meet her friends, and sometimes arrives a few minutes early.
    Which best describes Jasmine?
    A. Lonely
    B. Punctual
    C. Talkative
    D. Tardy
12. Bram Stoker is best known for his classic horror novel *Dracula*, which was published in 1897.

What did Bram Stoker do?

A. He was a doctor.
B. He was a merchant.
C. He was a writer.
D. He was an engineer.

13. Exhausted from her transatlantic flight, Judy could not stay up past 9 p.m.

What did Judy do at 9 p.m.?

A. Leave work
B. Come home from the airport
C. Get on an airplane
D. Go to bed

14. Eliot sleeps late whenever he can, leaves work early, and never does anything unless he absolutely has to.

Which best describes Eliot?

A. Boring
B. Lazy
C. Selfish
D. Tired.

15. Juanita rushed to her dance class and burst through the door in the nick of time.

When Juanita got to her dance class, she was

A. very early
B. very late
C. nearly late
D. a little late
# EAP Sentence Meaning Answer Key

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## Notes

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EAP LISTENING TEST

Purpose: The Accuplacer EAP Listening Test measures your ability to understand spoken English in a variety of situations. The conversations may take place at work, home, or school.

Length: 20 questions

Format: Multiple choice

First, you will listen to a spoken conversation, followed by a spoken question. The possible answers to the question are spoken and written. You will be asked to choose the best answer.

Helpful tip: During the test, you have the ability to listen to each section two more times by clicking on the “play” button next to each section.

The first time the test reads through each section, use that opportunity to select what you think is the best answer. Select “Play” to repeat the spoken conversation and spoken question, then determine if you still think the answer you originally selected is correct. You will still have one more opportunity to listen to the spoken conversation and spoken question before you move on to the next question. You can change your answer multiple times, but once you submit the answer and move on to the next question you cannot go back to the previous question. When you move to the next question it will start the spoken conversation immediately, be prepared.

Practice Tests: Take the listening practice tests below. You can check your answers throughout the tests.

- [https://accuplacerpractice.collegeboard.org/login](https://accuplacerpractice.collegeboard.org/login)
- [https://www.examenglish.com/TOEFL/TOEFL_listening_conversation1.htm](https://www.examenglish.com/TOEFL/TOEFL_listening_conversation1.htm)
- [https://www.examenglish.com/TOEFL/TOEFL_listening_conversation2.htm](https://www.examenglish.com/TOEFL/TOEFL_listening_conversation2.htm)
- [https://www.examenglish.com/TOEFL/TOEFL_listening_conversation3.htm](https://www.examenglish.com/TOEFL/TOEFL_listening_conversation3.htm)
- [https://www.seminolestate.edu/adult-ed/els/pett/listening](https://www.seminolestate.edu/adult-ed/els/pett/listening)

Review websites: Use these resources for helpful study guides and tips.

- [http://www.esl-lab.com/](http://www.esl-lab.com/)
WRITING TEST

Purpose: The Writing Test measures your ability to organize and communicate your ideas effectively in formal writing. The essay you write will decide the level of your first writing class here at North Hennepin Community College. It is important for you to do your very best writing.

Length: 60 minutes

Format: Write an essay of 4-5 paragraphs, with an introduction, a body, and a conclusion.

- In your introduction paragraph, include a thesis statement that gives the main points you will explain in your essay.
- For each body paragraph, include a topic sentence, specific information about your main point, and a concluding sentence
- Your concluding paragraph should provide a final idea about the main points in your essay.

Helpful tip: Write as much as you can in the time you have. Organize your ideas clearly and explain each idea completely. Carefully check your writing for correct grammar, spelling and punctuation.


Review grammar: [www.englishpage.com](http://www.englishpage.com)

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<th>Common Writing Errors</th>
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<td><strong>SINGULAR AND PLURAL NOUNS</strong></td>
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<tr>
<td><em>Incorrect:</em> She needs two book for this class.</td>
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<tr>
<td><em>Correct:</em> She needs two books for this class.</td>
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<tr>
<td><strong>POSSESSIVE NOUNS</strong></td>
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<tr>
<td><em>Incorrect:</em> John notebook is on the table.</td>
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<tr>
<td><em>Correct:</em> John’s notebook is on the table.</td>
</tr>
<tr>
<td><strong>WORD CHOICE</strong></td>
</tr>
<tr>
<td><em>Incorrect:</em> I like to drive my horse.</td>
</tr>
<tr>
<td><em>Correct:</em> I like to ride my horse.</td>
</tr>
<tr>
<td><strong>ARTICLES</strong></td>
</tr>
<tr>
<td><em>Incorrect:</em> We saw good movie yesterday.</td>
</tr>
<tr>
<td><em>Correct:</em> We saw a good movie yesterday.</td>
</tr>
<tr>
<td><strong>WORD FORM</strong></td>
</tr>
<tr>
<td><em>Incorrect:</em> I saw a beauty picture.</td>
</tr>
<tr>
<td><em>Correct:</em> I saw a beautiful picture.</td>
</tr>
<tr>
<td><strong>SUBJECT/VERB AGREEMENT</strong></td>
</tr>
<tr>
<td><em>Incorrect:</em> He like to study at the library.</td>
</tr>
<tr>
<td><em>Correct:</em> He likes to study at the library.</td>
</tr>
<tr>
<td>Category</td>
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<tr>
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<tr>
<td><strong>VERB FORM</strong></td>
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<td><strong>PUNCTUATION: RUN-ON</strong></td>
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<td><strong>VERB TENSE</strong></td>
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<tr>
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<td><strong>PUNCTUATION: COMMA-SPLICE</strong></td>
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<td><strong>CONJUNCTIONS/TRANSITIONS</strong></td>
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Math Placement Test

Structure

The math placement test is designed to measure student’s understanding of content areas in Arithmetic, Elementary Algebra, or College Level subjects. The test is comprised of 17 questions on the Arithmetic test, 12 questions on the Elementary Algebra test, and 20 questions on the College Level Math test. Test scores and placement are available immediately after completing the test. The Testing Advisor will explain test results and course placements to each student.

Guidelines

The placement test is not timed. Students are not permitted to use a personal calculator, a calculator tool on the computer, or the Internet. The Accuplacer’s calculator is the only calculator students may use, and it only appears on certain questions.

A calculator button will be displayed right next to the Accessibility button on the toolbar.

The sample questions in this packet are not intended to be exhaustive, but to aid the student’s review of certain math concepts. The first set of problems was developed by faculty at NHCC, including a review section, which explains how to solve the problems. The second set of questions is from College Board, the creators of the Accuplacer. To aid study, lists of content areas for each subject – Arithmetic, Elementary Algebra, and College Level math – are available, as well as a list of external study resources.

Students are highly encouraged to review for the math placement test before taking it. Take advantage of the resources and references provided by the Testing Center, as well as others you are aware of that may help your performance on the test.
You may use the list below to guide you in your review of Arithmetic concepts.

<table>
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<tr>
<td>Division of fractions</td>
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<tr>
<td>Division of a whole number by a fraction</td>
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<tr>
<td>Division of a fraction by a whole number or another fraction</td>
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<tr>
<td>Applications involving operations on two numbers</td>
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<tr>
<td>Square root and exponent operations</td>
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<tr>
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<tr>
<td>Multiplication of decimals</td>
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<tr>
<td>Division of decimals</td>
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<tr>
<td>Multiplication and division of decimals</td>
</tr>
<tr>
<td>Order of decimals, fractions, and percents; rounding</td>
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<tr>
<td>Calculate the percentage of a number</td>
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<tr>
<td>Applications</td>
</tr>
<tr>
<td>Fractions, ratios, and proportions</td>
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<tr>
<td>Calculating percentages</td>
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<tr>
<td>Adding and subtracting multiple fractions</td>
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<tr>
<td>Application of the greatest common factor and least common multiple</td>
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<tr>
<td>Calculate the average (mean)</td>
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<tr>
<td>Interpret frequency graphs</td>
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<tr>
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<tr>
<td>Items that have a negative stem</td>
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<tr>
<td>Addition of whole numbers, fractions, and decimals</td>
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<tr>
<td>Subtraction and repeated subtraction of whole numbers, fractions, and decimals</td>
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<tr>
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<tr>
<td>Division of whole numbers, fractions, and decimals</td>
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<tr>
<td>Currency</td>
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<tr>
<td>Computation with mixed numbers</td>
</tr>
</tbody>
</table>
NHCC’s Arithmetic Sample Questions

These sample questions are intended to guide you in your review of math concepts for the math placement test. **Practice the problems without a calculator**, you will not be allowed a personal calculator on the real test. Try the problems first before using the answer key at the end.

1. \[ 14 - 5 = \]
   a) -19  
   b) 11 
   c) -9  
   d) 9 

2. \[ 1 \frac{3}{5} \times 4 \]
   a) \( \frac{32}{5} \)  
   b) \( 1 \frac{12}{5} \)  
   c) \( \frac{23}{5} \)  
   d) \( \frac{32}{20} \) 

3. \[ \frac{9}{20} = \]
   a) 4.5  
   b) 0.18 
   c) 0.45  
   d) 0.09 

4. Subtract the following fractions: \[ \frac{4}{3} - \frac{5}{12} = \]
   a) \( -\frac{1}{9} \)  
   b) \( \frac{11}{12} \)  
   c) \( -\frac{1}{12} \)  
   d) \( \frac{4}{15} \) 

5. Find the product of \( \frac{3}{8} \) and \( \frac{2}{15} \).
   a) \( \frac{1}{20} \)  
   b) \( \frac{5}{23} \)  
   c) \( \frac{6}{23} \)  
   d) \( \frac{6}{15} \)
6. If a pot of soup is $\frac{2}{3}$ full before lunch and $\frac{1}{7}$ full after lunch, how much soup was used during lunch?

a) $\frac{1}{4}$  

b) $\frac{1}{21}$  

c) $\frac{11}{21}$  

d) $\frac{1}{7}$

7. Which of the following is not equivalent to $2\frac{4}{5}$?

a) 2.8  

b) $\frac{8}{5}$  

c) $\frac{14}{5}$  

d) $1\frac{9}{5}$

8. $(.35)^2$

a) .7  

b) .1225  

c) 12.25  

d) 7

9. What percent of 30 is 6?

a) 2%  

b) 20%  

c) 18%  

d) 5%

10. $3.2 \div 100 =$

a) .032  

b) 320  

c) .32  

d) .0032
11. \[5.7 + 3.6 - 1.4 =\]

   a) 10.2  
   b) 7.3  
   c) 7.9  
   d) 8.3

12. If a shirt costs $24.47 and a pair of pants costs $27.78, what is the cost if you buy both items?

   a) $52.25  
   b) $51.45  
   c) $41.25  
   d) $52.35

13. 21% of 78,456 is closest to:

   a) 200  
   b) 86,000  
   c) 160,000  
   d) 16,000

14. If 1 car weighs 2 tons and 1 semi weighs 12 tons, what is the ratio of the weight of 5 cars to 2 semis?

   a) 2:5  
   b) 5:2  
   c) 5:12  
   d) 1:6

15. If the length of a rectangle is 14 meters, and the width is 5 meters less than the length, what is the perimeter of the rectangle?

   a) 23 meters  
   b) 46 meters  
   c) 39 meters  
   d) 70 meters
### NHCC’s Arithmetic Sample Questions Answer Key

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
<td>A</td>
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<tr>
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<tr>
<td>5.</td>
<td>A</td>
<td>10.</td>
</tr>
<tr>
<td>11.</td>
<td>C</td>
<td>12.</td>
</tr>
<tr>
<td>15.</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

### Arithmetic Problem Review

#### 1. Answer: D) 9

**Content Area: Subtracting integers**

When subtracting integers, you want to think of moving on a number line. Starting at positive 14 which lies to the right of zero, to subtract 5, you move to the left five units and you end up at a positive 9.

#### 2. Answer: A) \[ \frac{32}{5} \]

**Content Area: Mixed Numbers, Multiplying Fractions**

When multiplying or dividing mixed numbers, we need to turn them into improper fractions first. If you multiply the whole number portion by the denominator and add it to the numerator, you will have the improper fraction equivalent. 

\[
1 \frac{3}{5} = \frac{1 \times 5 + 3}{5} = \frac{8}{5}
\]

To multiply a fraction by a whole number, put the whole number over 1 and multiply straight across.

\[
\frac{8}{5} \times \frac{4}{1} = \frac{8 \times 4}{5 \times 1} = \frac{32}{5}
\]

#### 3. Answer: C) .45

**Content Area: Division**

To find the decimal value of a fraction, divide the numerator by the denominator. You can use long division, or in this case you can notice that if you multiply the top and the bottom by 5, the denominator of the fraction will be 100, which is easily converted into a decimal if you remember that when you divide by 100 you move the decimal in the numerator two places to the left.

\[
\frac{9}{20} = \frac{9 \times 5}{20 \times 5} = \frac{45}{100} = .45
\]
4. Answer: B) $\frac{11}{12}$

To subtract (or add) fractions we need to make sure that we have common denominators. We can multiply the numerator and denominator by the same number so that the fractions have the same denominator, then we can subtract the numerators and put it over the common denominator.

$$\frac{4}{3} - \frac{5}{12} = \frac{4 \times 4}{3 \times 4} - \frac{5}{12} = \frac{16}{12} - \frac{5}{12} = \frac{11}{12}$$

5. Answer: A) $\frac{1}{20}$

To find the product means to multiply, and to multiply we just multiply “straight across”. Make sure to reduce your final answer by cancelling any common factors.

$$\frac{3}{8} \times \frac{2}{15} = \frac{3 \times 2}{8 \times 15} = \frac{3 \times 2}{2 \times 4 \times 3 \times 5} = \frac{1}{4 \times 5} = \frac{1}{20}$$

6. Answer: C) $\frac{11}{21}$

To find the remaining soup we need to subtract the remaining portion, $\frac{1}{7}$ from the starting portion, $\frac{2}{3}$. Remember to create common denominators before subtracting, like problem 4.

$$\frac{2}{3} - \frac{1}{7} = \frac{2 \times 7}{3 \times 7} - \frac{1 \times 3}{7 \times 3} = \frac{14}{21} - \frac{3}{21} = \frac{11}{21}$$

7. Answer: B) $\frac{8}{5}$

When we look at the four options, we see first that $\frac{4}{5} = .8$, so $2 \frac{4}{5} = 2.8$

Secondly, as an improper fraction, $2 \frac{4}{5} = \frac{2 \times 5 + 4}{5} = \frac{14}{5} \neq \frac{8}{5}$

Finally, if we take one whole number away, and put it with the fractional portion, we would get $1 \frac{1 \times 5 + 4}{5} = 1 \frac{9}{5},$ so b) is the only unequal value.
The exponent (in this case 2) tells you how many times to multiply the base (.35) by itself. To multiply decimals, it is easiest to do this vertically, and to multiply 35 by 35 and add move the decimal four places to the left at the end.

9. **Answer:** B) 20%  

Content Area: Percentage word problems

To answer this problem we want to set up an equation and solve it. We are looking for the percentage, which can be found by thinking of $\frac{\text{percentage}}{100}$. In the problem “of” means to multiply, and “is” means equals. Putting this all together “what percentage of 30 is 60” becomes the equation $\frac{x}{100} \times 30 = 6$.

Then to get $x$ alone, multiply by 100 and divide by 30. $x = \frac{6 \times 100}{30} = \frac{600}{30} = \frac{60}{3} = 20$

10. **Answer:** A) .032  

Content Area: Dividing decimals

To divide by 10, 100, 1000, etc, move the decimal point of the numerator to the left the number of zeros. (The opposite works with multiplication by a power of 10; move the decimal to the right)

$$\frac{3.2}{100} = .032$$

11. **Answer:** C) 7.9  

Content Area: Adding/Subtracting decimals

When adding decimals, make sure to keep everything lined up, and add just like whole numbers. Borrow digits if you need to perform the subtraction

$$\begin{align*}
5.7 + 3.6 & \Rightarrow 9.3 \\
9.3 & - 1.4 = 8.13 \\
& - 1.4 = 7.9
\end{align*}$$
12. Answer:  A) $52.25  

This problem is much like number 11 above. Be sure to keep track of the decimal place, and line up the correct values.

\[
\begin{align*}
24.47 \\
+ 27.78 \\
\hline
52.25
\end{align*}
\]

13. Answer:  D) 16,000  

This is a hard problem to do directly, but since we only need to approximate the answer, we can think of 78,456 as being 80,000 and as 21% as 20%. Then our multiplication problem becomes much easier.

\[
\frac{80,000 \times 20\%}{16,000} = \frac{80,000 \times 0.2}{16,000}
\]

14. Answer:  C) 5:12  

First we need to figure out the weight of 5 cars which is \( \frac{5 \times 2}{10} \text{ tons} \). The weight of 2 semis is \( 2 \times 12 = 24 \text{ tons} \). When creating ratios, always list the two pieces in order, separated by a colon, and reduce the ratio just like a fraction.

\[
10 : 24 = 5 \cdot \frac{2}{12} \cdot \frac{5}{2} = 5 : 12
\]

15. Answer:  B) 46  

To solve this geometry problem you need to know that the perimeter is the distance around the shape. If the width is 5 less than 14, then the width is 9 meters. Around a rectangle are two lengths and two widths, so the perimeter is \( 14 + 14 + 9 + 9 = 46 \).
Accuplacer Arithmetic 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. \(2.75 + 0.003 + 0.158 =\)
   
   a) 0.436  
   b) 2.911  
   c) 2.938  
   d) 4.36

2. \(7.86 \times 4.6 =\)
   
   a) 36.156  
   b) 36.216  
   c) 351.56  
   d) 361.56

3. \(\frac{7}{20} =\)
   
   a) 0.035  
   b) 0.35  
   c) 0.858  
   d) 3.5

4. Which of the following is the least?
   
   a) 0.105  
   b) 0.501  
   c) 0.015  
   d) 0.1

5. All of the following are ways to write 25 percent of N EXCEPT
   
   a) \((0.25)N\)  
   b) \(\frac{25}{100}N\)  
   c) \(\frac{1}{4}N\)  
   d) 25 N
6. Which of the following is closest to $27.8 \times 9.6$?

- a) 280
- b) 300
- c) 2,800
- d) 3,000

7. A soccer team played 160 games and won 65 percent of them. How many games did the team win?

- a) 94
- b) 104
- c) 114
- d) 124

8. There are three people who work full-time and are to work together on a project, but their total time on the project is to be equivalent to that of only one person working full-time. If one of the people is budgeted for one-half of his time to the project and a second person for one-third of her time, what part of the third worker’s time should be budgeted to this project?

- a) $\frac{1}{8}$
- b) $\frac{1}{6}$
- c) $\frac{1}{3}$
- d) $\frac{3}{5}$

9. 32 is 40 percent of what number?

- a) 12.8
- b) 128
- c) 80
- d) 800

10. $3 \frac{1}{3} - 2 \frac{2}{5} =$

- a) $\frac{1}{15}$
- b) $\frac{14}{15}$
- c) $1 \frac{1}{15}$
- d) $1 \frac{1}{2}$
11. \[ \frac{2\frac{1}{2}}{2} + 4\frac{2}{3} = \]

a) \(\frac{6\frac{1}{6}}{}\) b) \(\frac{6\frac{5}{6}}{}\) c) \(\frac{7\frac{1}{6}}{}\) d) \(\frac{7\frac{5}{6}}{}\)

12. What is \(\frac{1345}{99}\) rounded to the nearest integer?

   a) 12   b) 13   c) 14   d) 15

13. Three of four numbers have a sum of 22. If the average of the four numbers is 8, what is the fourth number?

   a) 4   b) 6   c) 8   d) 10

14. \[46.2 \times 10^{-2} = \]

   a) 0.0462   b) 0.462   c) 4.62   d) 462

15. If \[\frac{3}{2} \div \frac{1}{4} = n\], then \(n\) is between

   a) 1 and 3   b) 3 and 5   c) 5 and 7   d) 7 and 9

16. What is 12% of 120?

   a) 10   b) 14.4   c) 18.4   d) 28.8
17. A box in a college bookstore contains books, and each book in the box is a history book, an English book or a science book. If one-third of these books are history books and one-sixth are English books, what fraction of the books are science books?

a) \( \frac{1}{3} \)  

b) \( \frac{1}{2} \)  

c) \( \frac{2}{3} \)  

d) \( \frac{3}{4} \)

18. The measures of two angles of a triangle are 35° and 45°. What is the measure of the third angle of the triangle?

a) 95°  
b) 100°  
c) 105°  
d) 110°

19. Erica bought 3 \( \frac{1}{2} \) yards of fabric. If she uses \( \frac{2}{3} \) of the fabric to make a curtain, how much will she have left?

a) \( \frac{1}{6} \) yard  
b) \( \frac{1}{3} \) yard  
c) 1 \( \frac{1}{6} \) yards  
d) 2 \( \frac{1}{3} \) yards

20. Jen wants to tile the floor of her kitchen. The floor is rectangular and measures 12 feet by 8 feet. If it costs $2.50 per square foot for the materials, what is the total cost of the materials for tiling the kitchen floor?

a) $160  
b) $200  
c) $220  
d) $240
### Accuplacer Arithmetic Answer Key

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<tr>
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<td>A</td>
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<td>C</td>
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#### Notes

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Elementary Algebra

You may use the list below to guide your review of algebraic concepts.

Refer to the study resources listed on page 3 of this packet.

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<td>Factoring $ax^2 + bx + c$ over the integers</td>
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<tr>
<td>Operations with algebraic fractions involving addition, subtraction, multiplication, and division</td>
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<tr>
<td>Division of monomials and polynomials including simplification of algebraic fractions</td>
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<td><strong>Equations, Inequalities, and Word Problems</strong></td>
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<td>Solving quadratic equations by factoring</td>
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<tr>
<td>Translating written phrases or sentences into algebraic expressions or equations</td>
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<tr>
<td>Solving verbal problems in an algebraic context including geometric reasoning</td>
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<tr>
<td>Graphing</td>
</tr>
</tbody>
</table>
NHCC’s Elementary Algebra Sample Questions

These sample questions are intended to guide you in your review of math concepts for the math placement test. **Practice the problems without a calculator**, you will not be allowed a personal calculator on the real test. Try the problems first before using the answer key at the end.

1. Find the sum of: \(-4\) and \(-3\)
   a) -1  b) -7  c) 7  d) 12

2. Find the value of: \(5 + 3 \times (2 - 6) ÷ 2 \times 5\)
   a) -80  b) 17  c) -25  d) 3

3. What is the product of: \(-\frac{3}{5}\) and \(\frac{10}{7}\)
   a) \(-\frac{6}{7}\)  b) \(\frac{7}{2}\)  c) \(-\frac{13}{12}\)  d) \(\frac{50}{21}\)

4. Subtract: \(\frac{5}{6}\) from \(\frac{7}{4}\)
   a) 1  b) \(\frac{1}{12}\)  c) \(\frac{11}{12}\)  d) \(-\frac{3}{2}\)

5. If \(3x = \frac{5}{2}\), find the value of \(x\)
   a) 5  b) \(\frac{6}{5}\)  c) \(\frac{15}{2}\)  d) \(\frac{5}{6}\)
6. Find the value of $2 + 3|5 - 7|$

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<tbody>
<tr>
<td>a) 10</td>
<td>b) -4</td>
<td>c) 8</td>
<td>d) -10</td>
</tr>
</tbody>
</table>

7. Place the numbers in **ascending** order (from smallest to largest) $\left\{\frac{5}{4}, \frac{11}{12}, 1 \frac{1}{3}, \frac{5}{6}\right\}$

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<thead>
<tr>
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<tbody>
<tr>
<td>a) $\left{\frac{5}{6}, 1 \frac{1}{3}, \frac{11}{12}, \frac{5}{6}\right}$</td>
<td>b) $\left{\frac{5}{6}, \frac{5}{4}, \frac{11}{12}, 1 \frac{1}{3}\right}$</td>
<td>c) $\left{\frac{11}{12}, \frac{5}{6}, \frac{5}{4}, 1 \frac{1}{3}\right}$</td>
<td>d) $\left{\frac{5}{6}, \frac{11}{12}, \frac{5}{4}, 1 \frac{1}{3}\right}$</td>
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8. What is the **value** of $3x^2 - 2xy + y^2$ when $x = -2$ and $y = 3$?

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<tbody>
<tr>
<td>a) 9</td>
<td>b) 33</td>
<td>c) 6</td>
<td>d) 26</td>
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9. Simplify: $\frac{x^2-x-6}{x^2-9}$

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<tbody>
<tr>
<td>a) $\frac{x+2}{x+3}$</td>
<td>b) $\frac{x+6}{9}$</td>
<td>c) $\frac{x-3}{x}$</td>
<td>d) $\frac{x+6}{x-9}$</td>
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10. A rectangular garden is to be made with a perimeter of 54 meters. If the width is five meters less than the length, what are the dimensions of the garden?

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<tr>
<td>a) 24m by 30m</td>
<td>b) 12m by 17m</td>
<td>c) 6m by 9m</td>
<td>d) 11m by 16m</td>
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</tbody>
</table>
11. \((2a - 3)(a + 3) = \)

\[ a) \ 2a^2 - 9 \quad b) \ 2a^2 + 3a - 9 \quad c) \ 5a^3 - 9 \quad d) \ 2a^2 - 9a - 6 \]

12. Solve the equation: \(x^2 + 3x = 18\)

\[ a) \ \{-6, 3\} \quad b) \ \{2, -9\} \quad c) \ \{4, 3\} \quad d) \ \{6, 2\} \]

13. Find the sum of \(3x + 2\) and \(4 - x + x^2\)

\[ a) \ 4x + 6 \quad b) \ x^2 + 8x \quad c) \ x^2 + 2x + 6 \quad d) \ 5x^2 + x + 2 \]

14. Solve the inequality: \(-3(x - 2) < x - \frac{3}{2}\)

\[ a) \ \{x | x < 2\} \quad b) \ \{x | x > \frac{1}{2}\} \quad c) \ \{x | x > \frac{15}{8}\} \quad d) \ \{x | x < \frac{5}{2}\} \]

15. Simplify and add the radicals: \(\sqrt{75} + \sqrt{27}\)

\[ a) \ 8\sqrt{3} \quad b) \ \sqrt{102} \quad c) \ 34\sqrt{3} \quad d) \ 8\sqrt{6} \]
16. Evaluate \( \frac{5}{4^2} \)

a) 10  

b) 90  

c) 16  

d) 32

17. Which line has a slope of \( \frac{1}{2} \)?

- a)  
- b)  
- c)  
- d)  

18. Subtract: \( \frac{3x^2 - 2y}{xy} \)

- a) \( \frac{3x - 2}{xy} \)  
- b) \( \frac{3x}{xy} \)  
- c) \( \frac{3x - 2}{y - x} \)  
- d) \( \frac{x}{y - x} \)  

19. Two angles are supplementary. If the larger angle is \( 20^\circ \) more than three times the smaller, find the measure of each angle.

- a) \( 85^\circ, 275^\circ \)  
- b) \( 40^\circ, 140^\circ \)  
- c) \( 15^\circ, 75^\circ \)  
- d) \( 60^\circ, 120^\circ \)  

20. Write the phrase “the difference of a number and twice the square of a number” as a simplified algebraic expression.

- a) \( x^4 - 2 \)  
- b) \( 3x \)  
- c) \( x - 2x^2 \)  
- d) \( x^2 - 2x \)  

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NHCC’s Elementary Algebra Sample Questions Answer Key

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NHCC Elementary Algebra – Problem Review

1. Answer: B) -7

**Content Area: Adding Integers**

When you add numbers you can visualize a number line with negative numbers to the left and positive numbers to the right. If you start at the location $-3$ and add $-4$ to it you move 4 units to the left (since it is negative), so you end up at $-7$.

2. Answer: C) -25

**Content Area: Order of Operations**

When you see a list of operations and parentheses you must perform the operations in the correct order. Always start with any operations inside the parentheses first, and then apply any exponents. (There aren’t any in this problem) Next perform multiplication and division as they appear from left to right, and finally addition and subtraction in order from left to right.

\[
5 + 3(2 - 6) ÷ 2 \cdot 5 \\
5 + 3(-4) ÷ 2 \cdot 5 \\
5 + (-12) ÷ 2 \cdot 5 \\
5 + (-6) \cdot 5 \\
5 + (-30) \\
5 - 25
\]

3. Answer: A) $-\frac{6}{7}$

**Content Area: Multiplying Fractions, Reducing Fractions**

When you multiply fractions, you multiply the numerators (top) together and put your answer over the product of the denominators (bottom). You then need to reduce the fraction by canceling any common factors between the numerator and denominator. Remember that the product of a positive number and a negative number is always negative.

\[
-\frac{3 \cdot 10}{5 \cdot 7} = -\frac{30}{35} = -\frac{5 \cdot 6}{5 \cdot 7} = -\frac{6}{7}
\]
4. Answer: C) $\frac{11}{12}$  
**Content Area:** Subtracting Fractions, Finding the Least Common Denominator, translating phrases.

When the question asks you to subtract $\frac{5}{6}$ from $\frac{7}{4}$ it means $\frac{7}{4} - \frac{5}{6}$.

You need to know that to subtract (or add) fractions they need to have a common denominator. If you multiply the top and bottom of a fraction by the same value, you don’t change the value of the fraction. So to create a common denominator, factor the denominators so you can see what factor(s) each fraction is missing, and add those missing factors. You can then subtract the numerators and put the answer over the common denominator.

$$\frac{7}{2 \cdot 2} - \frac{5}{2 \cdot 3} = \frac{7 \cdot 3 - 5 \cdot 2}{2 \cdot 2 \cdot 3} = \frac{21 - 10}{12} = \frac{11}{12}$$

5. Answer: D) $\frac{5}{6}$  
**Content Area:** Solving equations/fractions

With equations we have the option to multiply (or divide) both sides by any non-zero quantity or we can add (or subtract) both sides by the same quantity without changing the solutions. This is important since it allows us to rewrite equations in a form that we prefer. The best form is to get the variable alone as in $x =$, since then we can easily see the solution.

For this problem we can get the $x$ term alone by dividing both sides by 3. To divide the right side by 3, remember that dividing means multiplying by the reciprocal. This gives us the solution.

$$x = \frac{5}{2} \div 3 = \frac{5}{2} \cdot \frac{1}{3} = \frac{5}{6}$$

6. Answer: C) 8  
**Content Area:** Order of Operations, Absolute Value

To evaluate this expression, we must first perform the operations inside of the absolute value symbols (just like parentheses). Remember that the absolute value of a number represents the distance from that number to zero so the absolute value is always positive. Make sure that you wait to add the 2 and the 3 until after you multiply the 3 because multiplication comes before addition.

$$2 + 3|5 - 7| = 2 + 3 \cdot 2 = 2 + 6 = 8$$
7. **Answer:** D) \{ \frac{5}{6}, \frac{11}{12}, \frac{5}{4}, \frac{1}{3} \} 

Content Area: Fractions

To compare fractions we need to create common denominators. The Least Common Denominator of all the fractions is 12. To convert the mixed number to a fraction multiply the denominator by the whole number and add it to the numerator. The four fractions can then be grouped in the right order.

\[
\begin{align*}
\frac{5 \cdot 2}{6 \cdot 2} &= \frac{10}{12} \\
\frac{11}{12} &= \frac{11}{12} \\
\frac{5 \cdot 3}{4 \cdot 3} &= \frac{15}{12} \\
\frac{1 \frac{1}{3}}{3 \cdot 4} &= \frac{4 \cdot 4}{12} \\
\end{align*}
\]

8. **Answer:** B) 33

Content Area: Evaluating expressions

To evaluate an expression we must replace each variable with the given value. Be careful with negative values.

The problem states that \( x = -2 \) and \( y = 3 \) so:

\[
3x^2 - 2xy + y^2 = 3(-2)^2 - 2(-2)(3) + (3)^2 = 3 \cdot 4 + 12 + 9 = 33
\]

9. **Answer:** A) \( \frac{x+2}{x+3} \)

Content Area: Factoring quadratics

Simplifying rational expressions

To simplify a rational expression you need to cancel any common factors (products). To see what the common factors are you need to factor the top and the bottom of the fraction. Only then can you see what factors are common and cancel them to get our final answer. Remember that quadratics often factor as the product of two binomials. For more help factoring polynomials see the web sites.

\[
x^2 - x - 6 = \frac{(x-3)(x+2)}{(x-3)(x+3)} = \frac{x+2}{x+3}
\]

10. **Answer:** D) 11m by 16m

Content Area: Word problems, Geometry formulas, Equation solving

To solve a word problem we need to translate it into an equation with variables. For this problem, the equation comes from the formula for the perimeter of a rectangle: \( P = 2l - 2w \). We also know the relationship between the width and the length: \( w = l - 5 \) To solve the problem we substitute the known quantities into the formula and solve the equation.

\[
P = 2l + 2w \\
(54) = 2l + 2(1) \\
54 = 2l + 2 \cdot 10 \\
54 = 4l - 10 \\
64 = 4l \\
16 = l \\
w = 16 - 5 \\
w = 11
\]
11. Answer: B) \(2a^2 + 3a - 9\)

When you multiply two binomials together (like this problem) you should remember the FOIL method. This is a way of making sure that you find all of the products. It stands for First, Outer, Inner and Last. After you find the four products add any like terms to find the final answer.

\[
(2a - 3)(a + 3) = \\
F \quad O \quad I \quad L \\
2a \cdot a + 2a \cdot 3 - 3 \cdot a - 3 \cdot 3 = \\
2a^2 + 6a - 3a - 9 = \\
2a^2 + 3a - 9
\]

12. Answer: A) \([-6, 3]\)

To solve a quadratic equation we need to get it in standard form \(ax^2 + bx + c = 0\), so subtract the 18 from both sides. Next we need to factor the expression. Remember that quadratics usually factor as two binomials and we can check our factoring by multiplying using the FOIL method to see that we haven’t changed the equation. We can then set each factor to zero and then solve to find our two solutions.

\[
x^2 + 3x = 18 \\
x^2 + 3x - 18 = 0 \\
(x + 6)(x - 3) = 0 \\
x + 6 = 0 \quad x - 3 = 0 \\
x = -6 \quad x = 3
\]

13. Answer: C) \(x^2 + 2x + 6\)

When you are asked to find the sum, it means to add polynomials, and the most important thing is to remember that you can only add terms that have the same variable. These are called like terms. We start this problem by grouping all of the like terms together in order: \(x^2, x, \) constant. Make sure to keep any negatives with the appropriate term. We then combine the like terms by adding their coefficients.

\[
3x + 2 + 4 - x + x^2 = \\
x^2 + 3x - x + 2 + 4 = \\
x^2 + 2x + 6
\]

14. Answer: C) \(\{x \mid x > \frac{15}{8}\}\)

When solving an inequality, we can treat it much like an equation. We can add or subtract quantities from both sides, and we can multiply and divide by a positive number on both sides without changing the answer. One difference between inequalities and equations is if we multiply or divide by a negative number we have to change the direction of the inequality. In this example we subtract and divide both sides to get the variable alone.

\[
-3(x - 2) < x - \frac{3}{2} \\
-3x + 6 < x - \frac{3}{2} \\
-4x < -\frac{3}{2} - 6 \\
-4x < \frac{12}{2} - \frac{15}{2} \\
-x < -\frac{15}{2} \\
-4x + 6 < \frac{3}{2} \\
\frac{(-4)}{(-4)} \quad x < \frac{15}{8} \\
-6 \quad -6 \\
x > \frac{15}{8}
\]

Content Area: Combining like terms

Content Area: Solving inequalities
To add radicals, we must simplify them first. To simplify, factor the numbers under the radical, then apply the radical to each perfect square like 25 or 9. After they are simplified, we can see which terms have the same radical and add them by adding their coefficients.

\[
\sqrt{75} + \sqrt{27} = \\
\sqrt{25 \cdot 3} + \sqrt{9 \cdot 3} = \\
5\sqrt{3} + 3\sqrt{3} = \\
8\sqrt{3}
\]

16. Answer: D) 32

When evaluating rational exponents, it is often helpful to convert the exponent to a radical. To do this you need to know that the denominator tells you the index of the radical and the numerator tells you the exponent to raise the expression to. It is usually best to evaluate the radical first, and then apply the exponent, but you can do it in either order.

\[
4^{\frac{5}{2}} = \left(\sqrt[2]{4}\right)^{5} = (2)^{5} = 32
\]

17. Answer: D)

To find the slope of a line, we need to look at the ratio of vertical change to horizontal change between any two points. On this graph the line goes through the point \((0, -1)\) and \((2, 0)\) so to find the slope:

\[
slope = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - (-1)}{2 - 0} = \frac{1}{2}
\]
18. Answer: A) \( \frac{3x^2 - 2y}{xy} \)  

To add rational expressions we need a common denominator which in this case is \( xy \). We create the common denominator by multiplying the top and bottom of each expression by the same quantity, then we add or subtract the numerators.

\[
\begin{align*}
\frac{3x}{y} - \frac{2}{x} &= \frac{3x^2}{xy} - \frac{2y}{xy} \\
\frac{3x^2 - 2y}{xy} &= \frac{3x^2 - 2y}{xy}
\end{align*}
\]

19. Answer: B) 40°, 140°  

Content Area: Word Problem, Geometry

To solve this problem you need to know that supplementary angles add up to 180 degrees. (Complementary angles add up to 90 degrees.) Using this information you can create an equation that represents the information. If we let \( x \) represent the smaller angle can solve the following equation. Once we know the value of \( x \) we can find the other angle.

\[
\begin{align*}
(x) + (3x + 20) &= 180 \\
4x + 20 &= 180 \\
4x &= 160 \\
x &= 40
\end{align*}
\]

20. Answer: C) \( x - 2x^2 \)  

Content Area: Translating expressions

To translate a phrase into an expression you have to know which words turn into which symbols. In this problem “difference” means to subtract, “a number” means a variable \( x \), “twice” means to multiply by 2, and “the square of a number” means \( x^2 \). Put it all together and you have \( x - 2x^2 \).
Accuplacer 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 on the right, 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) \( \pi R^2 - \pi \times 32 \)  
   d) \( \pi R^2 - \pi (R - 3)^2 \)

5. \( (3x - 2y)^2 = \)

   a) \( 9x^2 - 4y^2 \)  
   b) \( 9x^2 + 4y^2 \)  
   c) \( 9x^2 + 4y^2 - 6xy \)  
   d) \( 9x^2 + 4y^2 - 12xy \)
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. Which of the following expressions is equivalent to \( 20 - \frac{4}{5} x > 16 \)?

a) \( x \leq 5 \)  

b) \( x \geq 5 \)  

c) \( x \leq 32 \frac{1}{2} \)  

d) \( x \geq 32 \frac{1}{2} \)
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) \(\frac{31u}{5x}\)

15. 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) \(x + 3\)  
   c) \(x - 2\)  
   d) \(x + 2\)

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
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Notes

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College Level Mathematics

These sample questions are intended to guide you in your review of math concepts for the math placement test. **Practice the problems without a calculator**, you will **not** be allowed to use a personal calculator on the real test. Try the problems before using the answer key at the end.

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<td>Addition and subtraction of expressions involving absolute value</td>
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Accuplacer 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. \( \frac{5}{2^2} - \frac{3}{2^2} \)

   a) \( \frac{1}{2^2} \)  
   b) 2  
   c) \( \frac{3}{2^2} \)  
   d) \( \frac{5}{2^3} \)  
   e) \( 2^2 \)

2. If \( a \neq b \) and \( \frac{1}{x} + \frac{1}{a} = \frac{1}{b} \), then \( x = \)

   a) \( \frac{1}{b} - \frac{1}{a} \)  
   b) \( b - a \)  
   c) \( \frac{1}{ab} \)  
   d) \( \frac{a - b}{ab} \)  
   e) \( \frac{ab}{a - b} \)

3. If \( 3x^2 - 2x + 7 = 0 \), then \( (x - \frac{1}{3})^2 = \)

   a) \( \frac{20}{9} \)  
   b) \( \frac{7}{9} \)  
   c) \( -\frac{7}{9} \)  
   d) \( \frac{8}{9} \)  
   e) \( -\frac{20}{9} \)

4. The graph of which of the following equations is a straight line parallel to the graph of \( y = 2x \)?

   a) \( 4x - y = 4 \)  
   b) \( 2x - 2y = 2 \)  
   c) \( 2x - y = 4 \)  
   d) \( 2x + y = 2 \)  
   e) \( x - 2y = 4 \)
5. An equation of the line that contains the origin and the point (1, 2) is

a) \( y = 2x \) \hspace{1cm} b) \( 2y = x \) \hspace{1cm} c) \( y = x - 1 \) \hspace{1cm} d) \( y = 2x + 1 \) \hspace{1cm} e) \( \frac{y}{2} = x - 1 \)

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?

a) 3 \hspace{1cm} b) 4 \hspace{1cm} c) 5 \hspace{1cm} d) 6 \hspace{1cm} e) 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.)

a) \( 4\sqrt{130} \) \hspace{1cm} b) \( 20\sqrt{10} \) \hspace{1cm} c) \( 24\sqrt{5} \) \hspace{1cm} d) 100 \hspace{1cm} e) \( 104\sqrt{5} \)

8. If \( \log_{10} x = 3 \), then \( x = \)

a) \( 3^{10} \) \hspace{1cm} b) 1,000 \hspace{1cm} c) 30 \hspace{1cm} d) \( \frac{10}{3} \) \hspace{1cm} e) \( \frac{3}{10} \)

9. If \( f(x) = 2x + 1 \) and \( g(x) = \frac{x-1}{2} \), then \( f(g(x)) = \)

a) \( x \) \hspace{1cm} b) \( \frac{x-1}{4x+2} \) \hspace{1cm} c) \( \frac{4x+2}{x-1} \) \hspace{1cm} d) \( \frac{5x+1}{2} \) \hspace{1cm} e) \( \frac{(2x+1)(x-1)}{2} \)
10. If $\theta$ is an acute angle and $\sin \theta = \frac{1}{2}$, then $\cos \theta =$

|   | a) -1 | b) 0 | c) $\frac{1}{2}$ | d) $\frac{\sqrt{3}}{2}$ | e) 2 |
---|------|-----|-----------------|-----------------|-----|

11. $5y(2y - 3) + (2y - 3) =$

|   | a) $(5y + 1)(2y + 3)$ | b) $(5y + 1)(2y - 3)$ | c) $(5y - 1)(2y + 3)$ | d) $(5y - 1)(2y - 3)$ | e) $10y(2y - 3)$ |
---|----------------------|----------------------|----------------------|----------------------|------------------|

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 \( UT VW \). What is the total number of orderings of these letters from left to right, including \( UT VW \)?

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 \( n = 0, 1, 2, \ldots \). 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) \( f(a) > f(b) \)
Accuplacer College Level Math Answer Key

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ACCUPLACER SAMPLE QUESTIONS