COMMUNITY COLLEGE OF DENVER **TEST PREP SERVICES**

Arithmetic

Elementary Algebra

Reading Comprehension

Sentence Skills

Placement Test Preparation Workbook

Welcome to Community College of Denver!

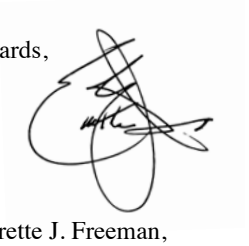
As the college president, it is my pleasure to personally welcome you to CCD. Whether you are here to learn specific job skills, earn a certificate or diploma, or to eventually transfer to a four year school, everyone at CCD is committed to helping you succeed.

Because we want you to thrive academically, all students who enroll at CCD must meet the assessment requirement by taking the placement test (or by providing transcripts of previous college work or SAT/ACT scores for review). This test helps serves as a placement guide, giving us a better idea of what course level would be best for you.

Your placement test scores are very important and they need to be an accurate reflection of your level of knowledge. This workbook was designed to help you brush up on your skills. Review the information, and do as well on the test as you possibly can; the questions and problems in this workbook are similar to what you will find on the test. Complete the workbook to the best of your ability before arranging to take your test.

Good luck on the test and I wish you great success as you complete your college goals.

Regards,



Everette J. Freeman,

Community College of Denver President

If you would like information regarding preparing for the test, please contact the Tutoring Center. We offer prep workshops and bootcamp experiences.

CCD Tutoring Center
Confluence Building, 4th Floor • 303.556.2497 • CCD.edu/TestPrep

To schedule your test, or for more information about the CCPT Placement Test, visit

CCD Testing Center Confluence Building, Room 216 • ccd.edu/testing

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English-as-a-Second-Language students should pick up a copy of our *Accuplacer ESL Preparation Workbook* from the Testing Center.

Students with Disabilities If you require test accommodations due to a disability, please contact the Accessibility Center for information concerning your needs.

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Placement Test
Study Workbook

Table of Contents

COMMUNITY COLLEGE OF DENVER

Some Basic Facts

This section will cover the following topics:

- Order of Operations
- Notation

Order of Operations

PEMDAS		Description
1	P = Parentheses	In this case, the term parentheses will include anything that would be considered a grouping symbol such as [ ], which are called square brackets. Also included in this list is the fraction line. For example, in the fraction $\frac{5+3}{2+7}$ first focus on the numerator and denominator separately to get $\frac{5+3}{2+7} = \frac{8}{9}$
2	E = Exponents	Exponents are a shortcut for multiplication. 2^4 means multiply 2 by itself 4 times.
3 4	M = Multiplication and D = Division	Multiplication and Division are considered the same in the order of operations. It is important to note, however, that they should be done left to right. Example 1: $10 \div 2 \times 3 = 5 \times 3 = 15$ Example 2: $6 \times 3 \div 2 = 18 \div 2 = 9$
5	A = Addition and S = Subtraction	As with multiplication and division, Addition and Subtraction are considered the same. They are also approached left to right. Example 1: $10 - 2 + 3 = 8 + 3 = 11$ Example 2: $6 + 3 - 2 = 9 - 2 = 7$

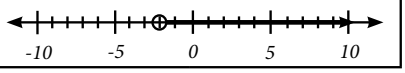
A Quick Tip

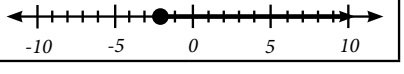
Even if you have not done math for a long time you are likely to remember a considerable amount. Taking just a few minutes reviewing notation can help you avoid missing problems you already know.

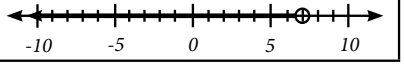
Notation

Math is a language of its own. It has vocabulary and punctuation (notation) just like any other language. To help you get ready for the placement exam, here is a list of some important notations to know.

Notation	Description
Multiplication	Multiplication can be expressed by the symbols: ×, •, *, or ( ) Examples: × : $5 \times 2 = 10$ • : $5 \cdot 2 = 10$ * : $5 * 2 = 10$ ( ) : $5(2) = 10$
Division	Division can be expressed by the symbols: ÷, /, –, or)‾ Examples: ÷ : $10 \div 2 = 5$ / : $10 / 2 = 5$ $\frac{a}{b}$: $\frac{10}{2} = 5$)‾ : $2\overline{)10}$ with -10 and 0
Exponents	Exponents are a shortcut for multiplication. For example, 3^4 is a shortcut way of saying, "multiply 3 by itself 4 times." In other words: $3^4 = 3 \times 3 \times 3 \times 3 = 81$

<table>
<tr><th>Notation</th><th>Description</th></tr>
<tr><td>Inequalities and Interval Notation</td><td>
Greater than:
<table>
<tr><td>Inequality</td><td>Interval Notation</td></tr>
<tr><td>$x > -2$</td><td>$(-2, \infty)$</td></tr>
<tr><td colspan="2">Number Line</td></tr>
<tr><td colspan="2"> 
</td></tr>
</table>
Note: the ">" in > -2 , the "(" in (-2,∞), and the hollow "○" mean include every number bigger than -2 but not -2 itself. For example, driving strictly faster than the speed limit may get you a ticket, but driving at the speed limit will not.

Greater than or Equal to:
<table>
<tr><td>Inequality</td><td>Interval Notation</td></tr>
<tr><td>$x \geq -2$</td><td>$[-2, \infty)$</td></tr>
<tr><td colspan="2">Number Line</td></tr>
<tr><td colspan="2"> 
</td></tr>
</table>
Note: the "≥" in x ≥ -2, the "[" in [-2,∞), and the solid "●" mean include every number bigger than -2 AND -2 itself. The standard legal age for getting a driver's license is 16 or older. The age of 16 is included.

Less than:
<table>
<tr><td>Inequality</td><td>Interval Notation</td></tr>
<tr><td>$x < 7$</td><td>$(-\infty, 7)$</td></tr>
<tr><td colspan="2">Number Line</td></tr>
<tr><td colspan="2"> 
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</table>
Less than or Equal to:
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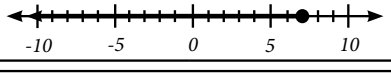
<tr><td colspan="2"> 
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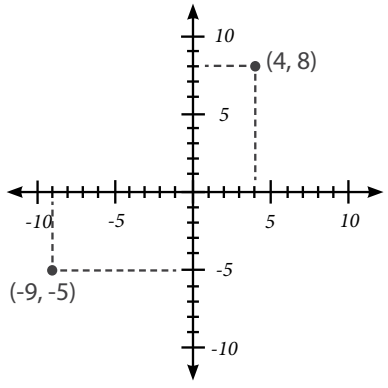
<table>
<tr><th>Notation</th><th>Description</th></tr>
<tr><td>Graphing Points in a Plane</td><td>
Points are written in the form of (x,y), which is called an "ordered pair."

The x represents the left-right distance from the center of the plane, while the y represents the up-down distance from the center.



</td></tr>
<tr><td>Square Roots</td><td>
The square root symbol is $\sqrt{\ }$.
It means the number that, when multiplied by itself, results in the value inside the root.

For example:
$\sqrt{4} = 2$ because $2 \times 2 = 4$

Common Roots:
<table>
<tr><td>$\sqrt{1} = 1$</td><td>$\sqrt{4} = 2$</td><td>$\sqrt{9} = 3$</td><td>$\sqrt{16} = 4$</td></tr>
<tr><td>$\sqrt{25} = 5$</td><td>$\sqrt{36} = 6$</td><td>$\sqrt{49} = 7$</td><td>$\sqrt{64} = 8$</td></tr>
<tr><td>$\sqrt{81} = 9$</td><td>$\sqrt{100} = 10$</td><td>$\sqrt{121} = 11$</td><td>$\sqrt{144} = 12$</td></tr>
</table>
</td></tr>
</table>

Additional Help

You can search YouTube.com for "order of operations."

Basic Facts Practice Problems

1.) $3 + 4 \cdot 5 - 6$

2.) $3^2 + 4 * 5 - 6 \div 2$

3.) $3^2 + 4 * (6 - 2) - 5$

4.) $\dfrac{3 + 5 * 2}{4 * 6 - 9}$

Substitution

This section will cover the following topics:

- Definition of Expression and Equation
- Evaluating an Expression Using Substitution
- Checking the Solution to an Equation Using Substitution

Definition of Expression and Equation

Both expressions and equations combine numbers, variables (such as x and y), and arithmetic operations (such as $+$, $-$, $\times$, and $\div$). The difference between expressions and equations is equations have an equals sign and expressions do not. Below are some examples of each kind.

Expressions	Equations
$2x$	$2x = 6$
$2x + 3y$	$2x + 3y = 7$
$3xy^2 + 2x$	$3xy^2 + 2x = 5$

Evaluating an Expression Using Substitution

The word "evaluate" means to find the numerical value of an expression and it requires that you know the value of all variables. For example, the expression $2x$ cannot be evaluated unless we know what number x is equal to. Let's say, for example, that we did know x=3. We could then use substitution to find the value of $2x$ by simply replacing every x with 3. That is, $2x = 2(3)$ or $2x = 6$.

More Examples:

Example 1	
Expression	$2x + 3y$
Value of the Variables	$x = -1,\ y = 3$
Substitution and Evaluation	$2(-1) + 3(3) =$ $-2 + 9 = 7$

Example 2	
Expression	$3xy^2 + 2x$
Value of the Variables	$x = 1,\ y = 3$
Substitution and Evaluation	$3(1)(3)^2 + 2(1)^2 =$ $27 + 2 = 29$

A Quick Tip

Substitution is a very useful tool when taking a placement exam. You can expect to see a few of these on the exam, and with just a bit of practice you can increase your placement score.

Checking the Solution to an Equation Using Substitution

The idea of using substitution with equations is the same as using substitution on expressions with one exception; both side of the equation must be equal (the same number). For example, if we have the equation $2x = 6$ and we substitute $x = 3$, then get 2(3) = 6 or 6 = 6. This is a true statement; 6 does equal 6. We would say that the solution $x = 3$ "checks."

But let's say we instead have the equation $2x = 6$ and we substitute $x = 4$. We get 2(4) = 6 or 8 = 6. This is a false statement; 8 does not equal 6, and we say that the solution $x = 4$ does not "check."

More Examples:

Example 1	
Expression	$2x + 3y = 7$
Value of the Variables	$x = -1,\ y = 3$
Substitution and Evaluation	$2(-1) + 3(3) = 7$ $-2 + 9 = 7$ $7 = 7$ *The solution checks*

Example 2	
Expression	$3xy^2 + 2x = 5$
Value of the Variables	$x = 1,\ y = 3$
Substitution and Evaluation	$3(1)(3)^2 + 2(1)^2 = 5$ $27 + 2 = 29$ $29 = 5$ *The solution does not check*

A Quick Tip

If you get an equation to solve on the placement exam, either solve it directly or check each possible answer using substitution as an alternative strategy. Choose the strategy that gives you the best chance to succeed!

Substitution Practice Problems

Evaluate the following expressions or check the equation using substitution.

1.) $a + 2b - 3c$
$a = 1,\ b = -2,\ c = 3$

2.) $3xy^2z^3$

$x = \frac{1}{2},\ y = 3,\ z = 2$

3.) $x^2 - 2x + 7$
$x = -4$

4.) $3x + 1 = 4$
$x = 1$

5.) $3x - 2 = 4x^2$
$x = -2$

6.) $x^2 + 3x - 1 = -3$
$x = -1$

Additional Help

You can search YouTube.com for "substitute values into expressions."

Solving Linear Equations

This section will cover the following topics:

- What is a Linear Equation?
- Solving One-Step Linear Equations
- Solving Two-Step Linear Equations
- Solving Linear Equations That Include Parentheses

What is a Linear Equation?

A linear equation is an equation in which the variable (or variables) have an exponent of 1, and in which the variables to do not appear in the denominator. Here are some examples of equations that are both linear and non-linear.

Equation	Linear (Yes or No?)
$x + 7 = 5$	Yes: The x does not appear to have an exponent, but in fact there is an implied exponent of 1. That is, when we write x, we mean x^1.
$5x + 7y = 10$	Yes: Even though there are multiple variables, they each have an implied exponent of 1.
$x^2 + 7 = 5$	No: In this case, the exponent of the x is 2. Thus, the equation is not a linear equation.
$+ 7x = 5$	No: Although the x variable has no visible exponent, it is in the denominator of the first term. Thus, the equation is not a linear.

Solving One-Step Linear Equations

A key thing to keep in mind is that solving an equation means to isolate the variable on one side of the equals sign. That is, the end result should look like, "$x =$ ___". A One-Step Linear Equation is a linear equation that is a single operation away from being solved; either through addition, subtraction, multiplication, or division.

Example 1:

$x + 7 = 5$	In this example, the only step that needs to be done is to eliminate the +7 from the left hand side of the equation. This is done by the "– 7". Remember that what is done to one side of the equation must be done to both.
$x + 7 - 7 = 5 - 7$	
$x = -2$	

Example 2:

$2x = 10$	In this example, the only step that needs to be done is to eliminate the 2 in front of the x. This is done by dividing both sides of the equation by 2.
$\frac{2x}{2} = \frac{10}{2}$	
$x = 5$	

Solving Two-Step Linear Equations

Solving Two-Step Linear Equations puts together the pieces in the above examples to solve a single problem. In other words, we will (1) add/subtract and then (2) multiply/divide. It will be done in that order, too.

Example 1:

$2x + 7 = 5$	In this example, the two steps that will need to be done are to divide by 2 and subtract 7 from both sides. We must do the "– 7" first. And will finish by dividing both sides by 2.
$2x + 7 - 7 = 5 - 7$	
$2x = -2$	
$\frac{2x}{2} = \frac{-2}{2}$	
$x = -1$	

Example 2:

$\frac{x}{2} - 3 = 5$	In this example, the two steps that will need to be done are to multiply by 2 and add 3 to both sides. We must do the "+ 3" first. And will finish by multiplying both sides by 2.
$\frac{x}{2} - 3 + 3 = 5 + 3$	
$\frac{x}{2} = 8$	
$2 \cdot \frac{x}{2} = 8 \cdot 2$	
$x = 16$	

A Quick Tip

If you get an equation to solve on the placement exam, either solve it directly or check each possible answer using substitution as an alternative strategy. Choose the strategy that gives you the best chance to succeed!

Linear Equations Practice Problems

Solving Linear Equations That Include Parentheses

To solve linear equations that involve parentheses, the first thing we must do is eliminate the parentheses on each side of the equation and then combine like terms. At that point, all we need to do is apply the same techniques we have already been doing.

Example 1:

$5(x + 2) - x = 14$	First, distribute the 5 over the parentheses
$5x + 10 - x = 14$	Then, combine the terms $5x$ and $-x$.
$4x + 10 = 14$	To finish, use the techniques from above; subtract 10 from each side followed by dividing both sides by 4.
$4x = 4$	
$x = 1$	

Example 2:

$3 + 7(x - 1) = 2$	First, distribute the 7 over the parentheses
$3 + 7x - 7 = 2$	Then, combine the terms 3 and -7.
$-4 + 7x = 2$	To finish, use the techniques from above; add 4 to each side followed by dividing both sides by 7.
$7x = 6$	
$x = \frac{6}{7}$	

Additional Help

You can search YouTube.com for "solving linear equations."

Solve the following Linear Equations.

1.) $x + 13 = 4$

2.) $x - 7 = 15$

3.) $5x = 15$

4.) $3x = -14$

5.) $2x - 7 = 3$

6.) $-5x + 2 = -13$

7.) $3(2x + 4) - 5 = 9$

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

Polynomials

This section will cover the following topics:

- Definitions; "Polynomial," "Like Terms" and "Combine Like Terms"
- Adding and Subtracting Polynomials
- Multiplying Polynomials
- Dividing a Polynomial by a Monomial

Definitions; "Polynomial," "Like Terms" and "Combine Like Terms"

A simple way to think of a **Polynomial** is that it is an expression that combines numbers and variables through addition, subtraction and multiplication. It is important to note that division is missing from this list. Additionally, this also implies that the exponent of each variable must be a positive counting number (1, 2, 3, 4, ...). Here are some examples to illustrate this.

Expressions	Polynomial (Yes or No?)
$x^3 - x^2 + 2x + 7$	Yes – only addition/subtraction/ multiplication are used, and the exponents are positive counting numbers.
$2x^{-5} + \frac{7}{y^2} - \sqrt{x}$	No – this expression includes the negative exponent "–5", division by y, and a square root – all of which are not allowed for polynomials.
$2x^5 + 7y^2$	Yes – even though there are multiple variables (x and y) this is still a polynomial.

Like Terms are parts of an expression that share the same variable (or variables) and each of those variables has the same exponent.

Terms	Like Terms (Yes or No?)
$2x^2y^3z$ and $7x^2y^3z$	Yes: Both terms share the same variables with the same exponents; x^2, y^3, and z.
$2x^2y^3z$ and $7x^2y^3$	No: The first term contains the variable z, however the second term does not.
$2x^2y^3z$ and $7x^4y^3z$	No: Although the variables are shared by both terms, the exponent of the x variable is "2" in the first term and "4" in the second term.

Now that we know what like terms are, we can define the phrase, "**Combine Like Terms.**" Think apples and oranges; Adding 2 apples to 7 apples to get 9 apples is combining like terms, however we cannot add 2 apples with 7 oranges because they are not "like." Like terms can be added or subtracted just like two sets of apples.

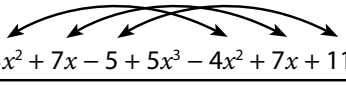
Examples:

$x^2 + x^2 = 2x^2$	$10x^2y + 5x^2y = 15x^2y$	Note that combining like terms is just adding or subtracting the numbers. e.g. $8 - 2 = 6$
$4x^2 - 9x^2 = -5x^2$	$8x^2y^3z - 2x^2y^3z = 6x^2y^3z$	

Adding and Subtracting Polynomials

Adding and subtracting polynomials is really just combining like terms with one exception; that exception will be highlighted in example two.

Example 1:

$3x^2 + 7x - 5 + 5x^3 - 4x^2 + 7x + 11$	First look for terms with the same variables AND exponents, and then add or subtract as needed. If a term is by itself, like $5x^3$, there is no need to do anything.
 $3x^2 + 7x - 5 + 5x^3 - 4x^2 + 7x + 11$	
$5x^3 - x^2 + 14x + 6$	

Example 2:

$-(2x^2 - 5x + 2) + 4(6x^2 - 9x + 1)$	In this case, there are parentheses that need to be removed before collecting like terms. This is done by distributing the "–" and the 4, which means multiplying every term inside the first set of parentheses by "–" and every term in the second set of parentheses by 4. Then, collect like terms.
$-2x^2 + 5x - 2 + 24x^2 - 36x + 4$	
$22x^2 - 36x + 2$	

Multiplying Polynomials

Let's start with a quick lesson on multiplying two single term expressions together. We will use the following rule; $x^a \cdot x^b = x^{a+b}$. That is when two expressions with the same base are multiplied (x is the base, a and b are the exponents) we can add the exponents together. Let's look at a few examples.

Example:

$2x^2 \cdot 5x^3 = 10x^5$	Multiply the numbers as usual. Then match up the variables (x with x, y with y, etc.) and add their exponents.
$12x^2y^5 \cdot 3x^7y = 36x^9y^6$	
$8x^3y^3z^5 \cdot 2x^2y^7z^2 = 16x^5y^{10}z^7$	

Next, let's take a look at multiplying a single term by a polynomial with multiple terms.

Example:

$3x^2(2x^3 - 3x^2 + 5x - 4)$	We must first distribute the $3x^2$ to each term inside the parentheses, and then multiply as we did in the last example.
$3x^2 \cdot 2x^3 - 3x^2 \cdot 3x^2 + 3x^2 \cdot 5x - 3x^2 \cdot 4$	
$6x^5 - 9x^4 + 15x^3 - 12x^2$	

To finish the multiplication of polynomials, we will multiply two binomials together using the technique called FOIL. FOIL gives the order in which the terms of each binomial should be multiplied; First – Outside – Inside – Last.

A Quick Recap

When adding/subtracting polynomials, remember apples and oranges. If terms have the same variables with the same exponents, they are like terms and can be added/subtracted.

Example:

First Term • First Term	$(x + 3)(x - 7) = x \cdot x$
Outside Term • Outside Term	$(x + 3)(x - 7) = x^2 - 7 \cdot x$
Inside Term • Inside Term	$(x + 3)(x - 7) = x^2 - 7x + 3 \cdot x$
Last Term • Last Term	$(x + 3)(x - 7) = x^2 - 7x + 3x - 21$
Finally, combine any like terms.	$(x + 3)(x - 7) = x^2 - 4x - 21$

Dividing a Polynomial by a Monomial

Dividing a polynomial by a monomial means dividing a polynomial by a single term. Here are a couple of examples of what that looks like.

Example 1:

$\frac{10x^7}{2x^2}$	This is an example of dividing a single term polynomial by a single term. It is best to work with numbers and variables separately.
$\frac{10x^7}{2x^2} = \frac{5x^7}{x^2}$	$10 \div 2 = 5$
$\frac{5x^7}{x^2} = 5x^{7-2} = 5x^5$	Then subtract the exponent of x in the denominator from the exponent in the numerator.

Example 2:

$\frac{10x^5 - 4x^4 + 7x^3 + 2x^2}{2x^2}$	This is an example of dividing a polynomial with multiple terms by a single term. We will again work with numbers and variables separately.
$\frac{10x^5}{2x^2} - \frac{4x^4}{2x^2} + \frac{7x^3}{2x^2} + \frac{2x^2}{2x^2}$	Before we do that, we must split the polynomial in the numerator.
$5x^3 - 2x^2 + \frac{7}{2}x + 1$	Once that is done, work term by term using the same techniques as was done in example 1.

Polynomial Practice Problems

Perform the following polynomial arithmetic.

1.) $2(3x^2 - 8x + 9) - 3(6x^2 - 4x + 1)$

2.) $7(5x^3 - x^2 + 4x) - (2x^2 - 3x + 4)$

3.) $2x^2(6x^2 - 4x + 1)$

4.) $(2x + 7)(3x - 1)$

5.) $\dfrac{9x^4 - x^3 + 3x^2}{3x^2}$

Additional Help
You can search YouTube for "adding polynomials," "multiplying polynomials," or "dividing polynomials."

Factoring Polynomials

This section will cover the following topics:

- Factoring the Greatest Common Factor
- Factoring Trinomials by Trial and Error
- Solving Equations by Factoring

Factoring the Greatest Common Factor

The most basic type of factoring for polynomials is to factor out the Greatest Common Factor (GCF). The goal of factoring is to undo multiplication. Let's take a look at what multiplying a single term into a polynomial looks like, and then we will work backwards.

Example of Multiplication of a Polynomial by a Single Term

$\mathbf{3x^2}(2x^3 - 3x^2 + 5x - 4)$	We must first distribute the $\mathbf{3x^2}$ to each term inside the parentheses, and then multiply term by term.
$\mathbf{3x^2} \cdot 2x^3 - \mathbf{3x^2} \cdot 3x^2 + \mathbf{3x^2} \cdot 5x - \mathbf{3x^2} \cdot 4$	
$6x^5 - 9x^4 + 15x^3 - 12x^2$	

Additional Help
You can search YouTube.com for "factoring the GCF," "factoring trinomials," or "solving quadratic equations by factoring."

A Quick Tip

Factoring can get complicated very quickly, and so can factoring techniques. On the placement exam, keep it simple. These represent the difficulty level you will find on the exam.

Working backwards, let's start with the polynomial $6x^5 - 9x^4 + 15x^3 - 12x^2$. When factoring the GCF, deal with the numbers and each variable separately to determine the overall GCF.

Finding the GCF of $6x^5 - 9x^4 + 15x^3 - 12x^2$

GCF of the Coefficients (dealing with the numbers)	6, 9, 15, and 12 are the coefficients. All of these numbers are divisible by 1 and 3 only. Always take the highest number, which in this case is 3.
GCF of the Variable (dealing with the x-variable)	These include x^5, x^4, x^3, and x^2. To find the GCF of variables, take the variable raised to the lowest exponent. In this case, that is x^2.
The Overall GCF	Putting the GCF of the numbers and variables together, we get GCF = $3x^2$
Factor the GCF Start by factoring $3x^2$ from each term. Then factor $3x^2$ outside parentheses with the remaining terms inside	$6x^5 - 9x^4 + 15x^3 - 12x^2$ $\mathbf{3x^2} \cdot 2x^3 - \mathbf{3x^2} \cdot 3x^2 + \mathbf{3x^2} \cdot 5x - \mathbf{3x^2} \cdot 4$ $\mathbf{3x^2}(2x^3 - 3x^2 + 5x - 4)$

Factoring Trinomials by Trial and Error

Once again, we will start with the idea that factoring will undo multiplication. For trinomials (polynomials with three terms), this means we will be undoing FOIL-ing (see the review on Polynomials for details).

Example of FOIL-ing

First Term • First Term	$(x + 3)(x - 7) = x \cdot x$
Outside Term • Outside Term	$(x + 3)(x - 7) = x^2 - 7 \cdot x$
Inside Term • Inside Term	$(x + 3)(x - 7) = x^2 - 7x + 3 \cdot x$
Last Term • Last Term	$(x + 3)(x - 7) = x^2 - 7x + 3x - 21$
Finally, combine any like terms	$(x + 3)(x - 7) = x^2 - 4x - 21$

To work backwards, we will start by considering the possible ways to factor the first term, x^2 and the last term, -21. We will then write all possible factorizations based on those.

Example 1: Factor $x^2 - 4x - 21$

Possible Factors of First Term	Possible Factors of Last Term	Possible Factorization	Check by FOIL-ing
$x^2 = x \cdot x$	$-21 = -3 \cdot 7$	$(x - 3)(x + 7)$	$x^2 + 4x - 21$
$x^2 = x \cdot x$	$-21 = 3 \cdot -7$	$(x + 3)(x - 7)$	$x^2 - 4x - 21$*
$x^2 = x \cdot x$	$-21 = -1 \cdot 21$	$(x - 1)(x + 21)$	$x^2 + 20x - 21$
$x^2 = x \cdot x$	$-21 = 1 \cdot -21$	$(x + 1)(x - 21)$	$x^2 - 20x - 21$

*Note that we could have stopped at the second row because we found the factorization.

Example 2: Factor $2x^2 - 5x + 3$

Possible Factors of First Term	Possible Factors of Last Term	Possible Factorization	Check by FOIL-ing
$2x^2 = 2x \cdot x$	$3 = 1 \cdot 3$	$(2x + 1)(x + 3)$	$2x^2 + 7x + 3$
		$(2x + 3)(x + 1)$	$2x^2 + 5x + 3$
$2x^2 = 2x \cdot x$	$3 = -1 \cdot -3$	$(2x - 1)(x - 3)$	$2x^2 - 7x + 3$
		$(2x - 3)(x - 1)$	$2x^2 - 5x + 3$

Solving Equations by Factoring

A very important point about solving equations by factoring is that one side of the equation must be equal to zero. Once you have that, solving equations by factoring is easy; simply factor and then set each factor equal to zero.

Example 1: $2x^2 - 6x = 0$

Factor out the GCF.	$2x(x - 3) = 0$	
Set each factor equal to zero.	$2x = 0$	$x - 3 = 0$
Solve each equation.	$2x = 0$	$x = 3$

Example : $3x^2 - 5x = 2$

Write equation with = 0.	$3x^2 - 5x - 2 = 0$	
Factor.	$(3x + 1)(x - 2) = 0$	
Set each factor equal to zero.	$3x + 1 = 0$	$x - 2 = 0$
Solve each equation.	$x = -\frac{1}{3}$	$x = 2$

Factoring Polynomials Practice Problems

Factor the following expressions, or factoring to solve the following equations.

1.) $6x^5 + 9x^4 - 24x^3 + 18x^2$

2.) $x^2 - 4x - 32$

3.) $3x^2 + 14x - 5$

4.) $3x^2 - 4x = 0$

5.) $x^2 - 3x - 28 = 0$

6.) $2x^2 - 5x = 7$

Fractions

This section will cover the following topics:

- Reducing to Lowest Terms
- Converting between Mixed Numbers and Improper Fractions
- Multiplying and Dividing
- Adding and Subtracting

Reducing

Fractions have the ability to look different without changing value. A common example that is given is slicing a pizza. Suppose someone was feeling very hungry and wanted a very large slice of pizza so they cut the pizza into two slices by cutting right down the middle. Eating only one of those very large slices would mean eating exactly ½ of the pizza. But if the pizza were bought from a shop where it was already sliced into eight pieces, that person could easily still eat ½ of the pizza by eating 4 out of 8 slices. In fractions, that means $\frac{4}{8} = \frac{1}{2}$. Even though these fractions look quite different, they still represent the same value. Here are some examples to illustrate how fractions are reduced, and what it means to be reduced to **lowest terms**. The key is to look for common divisors.

Example 1:

$\frac{6}{9} = \frac{6 \div 3}{9 \div 3} = \frac{2}{3}$	In looking at the fraction $\frac{6}{9}$, we are looking for a number which will divide both 6 and 9, which is 3. 3 is called a common divisor. $\frac{2}{3}$ is in lowest terms because 2 and 3 do not share a common divisor, so we are done.

A Quick Tip

Whenever doing math, either in a class or on the placement exam, fractions are always reduced.

Example 2:

$\frac{24}{30} = \frac{24 \div 6}{30 \div 6} = \frac{4}{5}$	$\frac{24}{30}$ is a bit more challenging because there are many numbers which divide both 24 and 30. They are 2, 3, and 6. We will use 6 to do the reduction because it is the greatest; called the greatest common divisor.

Example 3:

$\frac{216}{240} = \frac{216 \div 2}{240 \div 2} =$ $\frac{108 \div 2}{120 \div 2} = \frac{54 \div 2}{60 \div 2} =$ $\frac{27 \div 3}{30 \div 3} = \frac{9}{10}$	$\frac{216}{240}$ looks nearly impossible, but will turn out to be much easier than it looks if we take it step-by-step. That is, let's start with dividing both 216 and 240 by 2 since they are both even numbers. From there we will continue by dividing by 2, 2, and finally 3.

Converting between Mixed Numbers and Improper Fractions

Let's start by giving an example of a mixed number and an improper fraction. $3\frac{1}{2}$ is a mixed number because is mixes a whole number (the 3) with a fraction (the $\frac{1}{2}$). The fraction $\frac{7}{2}$ is an improper fraction because the numerator is larger than the denominator. We can convert between these two forms in the following ways.

Convert a Mixed Number to an Improper Fraction:

$3\frac{1}{2}$ to $\frac{7}{2}$

First multiply the whole 3 by the denominator 2.	$3\frac{1}{2} : 3 \times 2 = 6$
Then take the resulting 6 and add the numerator of 1.	$3\frac{1}{2} : 6 + 1 = 7$
The 7 becomes the new numerator and the 2 remains the denominator.	$\frac{7}{2}$

Convert an Improper Fraction to a Mixed Number: $\frac{7}{2}$ to 3 $\frac{1}{2}$

First we must determine how many times 2 goes into 7 without going over 7. The answer (bolded) is 3 times with 1 left over.	$2 \times 1 = 2$ $2 \times 2 = 4$ **$2 \times 3 = 6$** $2 \times 4 = 8$
	$\frac{7}{2} = 3\frac{1}{2}$:

Multiplying and Dividing

Multiplication and Division are relatively straightforward. For multiplication remember to multiply across (numerator × numerator and denominator × denominator) and then reduce. For division of fractions, simply change division to multiplication. To change division into multiplication, remember Copy – Dot – Flip. That is, copy the first fraction – change division (÷) to multiplication (·) – and flip the section fraction ($\frac{a}{b} \rightarrow \frac{b}{a}$).

Multiplication Example 1: $\frac{4}{5} \cdot \frac{3}{8}$

$\frac{4}{5} \cdot \frac{3}{8} = \frac{12}{40}$	Multiply Across
$\frac{12 \div 4}{40 \div 4} = \frac{3}{10}$	Reduce to Lowest Terms

Multiplication Example 2: $\frac{10}{6} \cdot \frac{9}{12}$

$\frac{10}{6} \cdot \frac{9}{12} = \frac{90}{72}$	Multiply Across
$\frac{90 \div 18}{72 \div 18} = \frac{5}{4}$	Reduce to Lowest Terms

Division Example 1: $\frac{5}{6} \div \frac{10}{7}$

$\frac{5}{6} \div \frac{10}{7} = \frac{5}{6} \cdot \frac{7}{10}$	Copy - Dot - Flip
$\frac{5}{6} \cdot \frac{7}{10} = \frac{35}{60}$	Multiply Across
$\frac{35 \div 5}{60 \div 5} = \frac{7}{12}$	Reduce to Lowest Terms

Division Example 2: $\frac{8}{9} \div \frac{6}{5}$

$\frac{8}{9} \div \frac{6}{5} = \frac{8}{9} \cdot \frac{5}{6}$	Copy - Dot - Flip
$\frac{8}{9} \cdot \frac{5}{6} = \frac{40}{54}$	Multiply Across
$\frac{40 \div 2}{54 \div 2} = \frac{20}{27}$	Reduce to Lowest Terms

Adding and Subtracting

While multiplying and dividing fractions are straightforward, adding and subtracting fractions are not – UNLESS – you have a common denominator between the two fractions. So that's the trick – get a common denominator before adding/subtracting.

Addition Example: $\frac{2}{3} + \frac{1}{4}$

$\frac{2 \cdot 4}{3 \cdot 4} = \frac{8}{12}$ $\frac{1 \cdot 3}{4 \cdot 3} = \frac{3}{12}$	The common denominator is 12. Multiply first fraction by 4's and the second by 3's.
$\frac{8}{12} + \frac{3}{12} = \frac{11}{12}$	Add the numerators and reduce if necessary.

Subtraction Example: $\frac{5}{6} - \frac{2}{9}$

$\frac{5 \cdot 3}{6 \cdot 3} = \frac{15}{18}$ $\frac{2 \cdot 2}{9 \cdot 2} = \frac{4}{18}$	The common denominator is 18. Multiply first fraction by 3's and the second by 2's
$\frac{15}{18} + \frac{4}{18} = \frac{11}{18}$	Subtract the numerators and reduce if necessary.

A Quick Tip

It is easy to confuse the techniques between multiplying/dividing fractions and adding/subtracting fractions, and it often is related to when a common denominator is needed. Remember that a common denominator is needed only for addition and subtraction of fractions.

Fractions Practice Problems

Reduce the following fractions to lowest terms.

1.) $\frac{12}{15}$

2.) $\frac{32}{40}$

3.) $\frac{12}{16}$

Convert the following mixed numbers to improper fractions, and improper fractions to mixed numbers.

4.) $2\frac{1}{3}$

5.) $5\frac{3}{7}$

6.) $\frac{22}{3}$

7.) $\frac{19}{8}$

Perform the following multiplication/division problems with fractions.

8.) $\frac{2}{5} \cdot \frac{10}{3}$

9.) $\frac{6}{9} \cdot \frac{3}{8}$

10.) $\frac{3}{4} \div \frac{1}{2}$

11.) $\frac{2}{7} \div \frac{5}{14}$

Perform the following addition/subtraction problems with fractions.

12.) $\frac{1}{4} + \frac{3}{5}$

13.) $\frac{4}{9} + \frac{2}{6}$

14.) $\frac{5}{6} - \frac{3}{4}$

15.) $\frac{4}{5} - \frac{2}{3}$

Additional Help

You can search YouTube.com for "reducing fractions," "converting fractions" or "adding/subtracting/multiplying/dividing fractions."

Graphing Lines

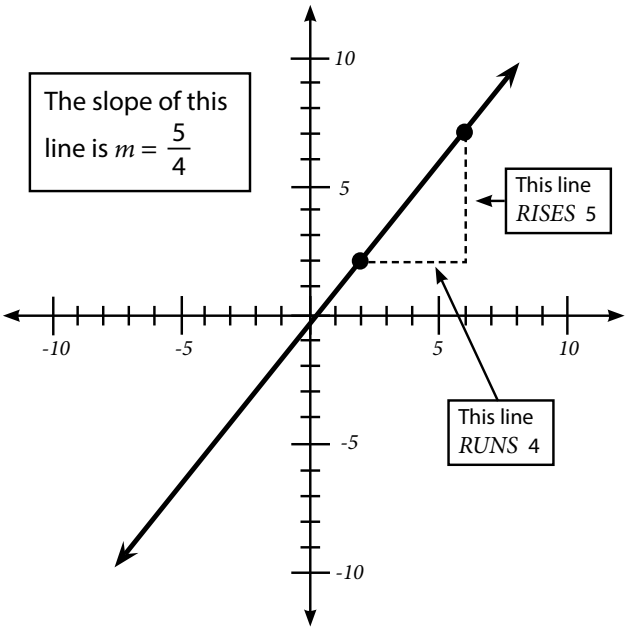
This section will cover the following topics:

- Slope and the Slope Formula
- Equation of a Line in Slope-Intercept Form
- Graphing Lines

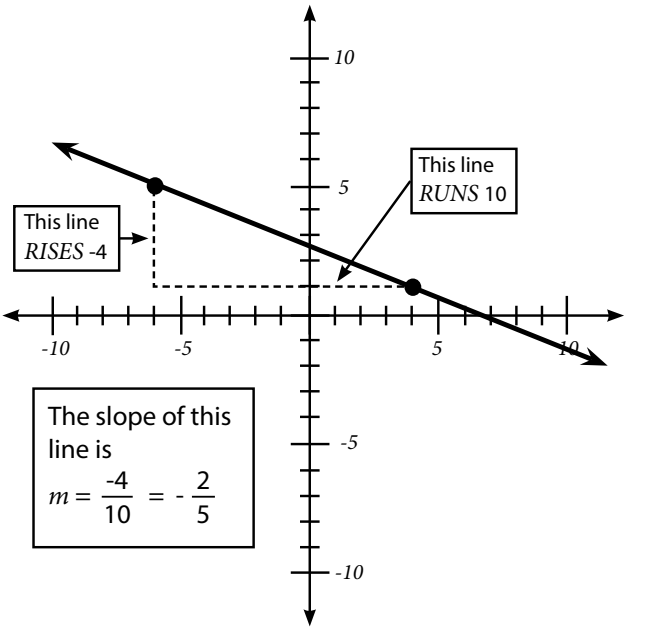
Slope and the Slope Formula

Every line travels in a specific direction. That direction is referred to as the slope of a line, which is often expressed as $m = \frac{RISE}{RUN}$; that is, a measure of how quickly a line rises (or falls) relative to quickly it runs (or travels to the right). The examples below illustrate this.

Example 1:



Example 2:

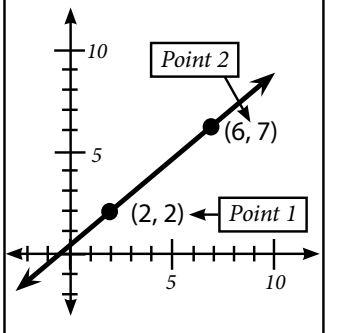


An analytical way of determining the slope of a line is through the slope formula, which is $m = \frac{y_2 - y_1}{x_2 - x_1}$
Here is an example of how the slope formula is used.

Using the graph on the right, will let
$(x_1, y_1) = (2, 2)$, and
$(x_2, y_2) = (6, 7)$.

From here we do a substitution into the slope formula to get,

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 2}{6 - 2} = \frac{5}{4}$$



A Quick Tip

With *x-intercepts* and *y-intercepts*, we already know half of the ordered pair; Remember a line crosses the *y-axis* (the *y-intercept*) when $x = 0$ and a line crosses the *x-axis* (the *x-intercept*) when $y = 0$.

Additional Help

Search YouTube.com for "slope of a line," "slope formula," or "graphing a line."

Equation of a Line in Slope-Intercept Form

The slope-intercept form of the equation of a line is $y = mx + b$, where m represents the slope and b represents the *y-intercept*. More precisely, the *y-intercept* is the point $(0, b)$. Note that the *y-intercept* occurs when $x = 0$, thus the *y-intercept* is $(0, b)$ no matter what the value of b. Let's look at some examples of identifying the slope and intercept from such equations.

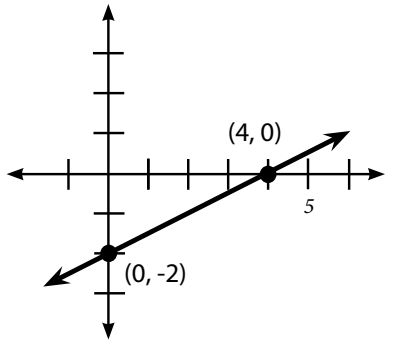
Equation	Slope	y-intercept	Notes
$y = 5x - 2$	$m = 5$	(0, -2)	It may be helpful to write $m = \frac{5}{1}$; that is, $RISE = 5$ and $RUN = 1$
$y = -\frac{3}{5}x + \frac{1}{2}$	$m = -\frac{3}{5}$	$(0, \frac{1}{2})$	Be sure to include the negative sign with the slope.

Graphing Lines

Graphing lines starts with a very simple concept. Draw two points and then connect them with a straight line. The only question is how you get the two points. We will take a look at two methods to graph the line $y = \frac{1}{2}x - 2$

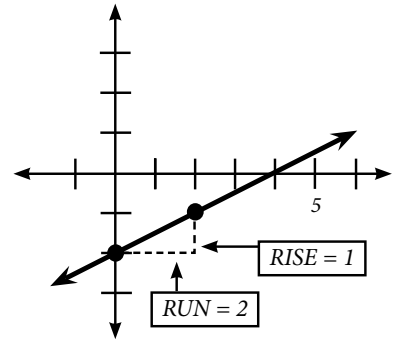
Method 1: Determine the *x* and *y-intercepts*.

y-intercept	***x-intercept***
This one is easy because the equation $y = \frac{1}{2}x - 2$ tells us that the *y-intercept* is the point (0, -2)	We let $y = 0$ $0 = \frac{1}{2}x - 2$ Solving for x gives $x = 4$ The *x-intercept* is (4, 0)



Method 2: Graph the *y-intercept* and then use the slope to create a second point.

y-intercept	***slope***
Again this is easy because the equation $y = \frac{1}{2}x - 2$ tells us that the *y-intercept* is the point (0, -2)	Here we will interpret the slope $m = \frac{1}{2}$ as $\frac{RISE}{RUN}$. From (0, -2), we will *RISE 1* and *RUN 2*.



Graphing Lines Practice Problems

Use the slope formula to find the slope of the line that connects the following points.

1.) (-2, 7) and (4, 1)

2.) (-1, -3) and (3, 6)

Identify the slope and y-intercept given the following equations.

3.) $y = -3x + 4$

4.) $y = \frac{2}{3}x - \frac{5}{7}$

Graph the following lines.

5.) $y = -2x + 5$

6.) $y = \frac{3}{4}x - 2$

Worksheet

Reading and Writing

The reading and writing portion of the test offers a variety of questions in differing formats. The focus of these sections will cover content in the following areas:

- Recognize main ideas, themes, tone, writing styles, and author's purpose
- Correctly summarizing information provided through inference or explicitly
- Analyze the organization of a text's structure, the meaning of the text (argument, narrative, informative), and word choice
- Identify sentence relationships, the meaning of words (vocabulary), and the use of figurative language
- Communicating difficult information with clarity and logic
- Isolating misused and/or frequently confused words
- Sentence level writing skills
- Writing Mechanics such as grammar, punctuation, and spelling

Vocabulary

1. Read the sentence and choose the word that best fits into the sentence.

   The team might _____ the football game.

   a. loose
   b. lost
   c. lose
   d. loops

2. Read the sentence and choose the word that best fits into the sentence.

   My grandfather was _____ handsome when he was a young man.

   a. quit
   b. quiet
   c. quote
   d. quite

3. Which of these could be a main heading that includes the other three terms as example?

   a. soccer
   b. football
   c. sports
   d. tennis

4. Which of these could be a main heading that includes the other three terms as example?

   a. dolphin
   b. mammals
   c. elephant
   d. mongoose

5. Which of these could be a main heading that includes the other three terms as example?

   a. tea
   b. juice
   c. beverages
   d. milk

Using the model provided, answer the question.

Definition	**Characteristics**
spread out	laying down with the body and limbs spread out awkwardly
Examples	**Non-Examples**
taking up the entire bed during a nap; using the entire tabletop while doing homework	keeping papers stacked and neatly organized on a desk; leaving room for others to sit on the couch

6. Which of the following words best belongs in the center of the model shown?

   a. Recondition
   b. Barrier
   c. Sprawl
   d. Prod

Using the model provided, answer the question.

Definition used for help or support	**Characteristics** often times, free assistance in achieving an objective
Examples going to the library to research a paper	**Non-Examples** failing a math class, but refusing to use a tutor

7. Which of the following words best belongs in the center of the model shown?

   a. Dwindle
   b. Administrator
   c. Articulate
   d. Resource

Using the model provided, answer the question.

Definition direct carefully and safely	**Characteristics** Moving carefully, and calculated, through directions and a planned course
Examples using a travel map	**Non-Examples** getting lost

8. Which of the following words best belongs in the center of the model shown?

   a. Challenge
   b. Barrage
   c. Navigate
   d. Reliance

9. Fill in the blank with the correct word.

   I have _____ new pairs of shoes

   a. too
   b. to
   c. two
   d. toe

10. Fill in the blank with the correct word.

    I _____ the glass in the trash because it is broken.

    a. through
    b. trough
    c. though
    d. threw

11. Fill in the blank with the correct word.

    _____ going to travel out of town for the weekend.

    a. They're
    b. There
    c. Their
    d. Theyre

12. Read the sentence and choose the word that best fits into the sentence.

    The dog tried to _____ the bone in the flower garden.

    a. berry
    b. bury
    c. bully
    d. belly

Sentence Relationship

Read the following selections and answer the questions that follow.

13. (1) Carpentry is rewarding in many ways. (2) Working with wood can be relaxing and creative. (3) Carpenters enjoy working with their hands. (4) My father, a carpenter, opened a wood-working shop.

    Which sentence does NOT belong in the selection?

    a. Sentence 1
    b. Sentence 2
    c. Sentence 3
    d. Sentence 4

14. (1) Your attitude about your job may affect your chances of becoming sick. (2) A cold and a viral infection are common illnesses. (3) A university study indicated that employees with good attitudes were sick less often. (4) On the other hand, those that were unhappy used their sick days more frequently.

Which sentence does NOT belong in the selection?

a. Sentence 1
b. Sentence 2
c. Sentence 3
d. Sentence 4

15. (1) Lighting in a hospital room is important. (2) Each room usually has two kinds of light: overhead and a bed lamp. (3) The lighting should be adjusted so each patient in the room has sufficient light. (4) Hospital beds are usually adjustable too.

Which sentence does NOT belong in the selection?

a. Sentence 1
b. Sentence 2
c. Sentence 3
d. Sentence 4

16. Suppose you want to find information about recent laws passed by the United States Congress. What source might be the best to use for finding information on the subject?

a. An encyclopedia
b. The college's online library database
c. The internet
d. An American history book

17. You are interested in finding information on Hitler's rise to power prior to WWII? What source might be the best to use for finding information on the subject?

a. The internet
b. An history book
c. The local newspaper
d. A Teen magazine

Reading Comprehension

Read the following passages and answer the questions that follow.

Researchers studying anorexia in twins conclude that more than half a person's risk for developing the sometimes fatal eating disorder is determined by genes. Most experts already believe there is a strong genetic component to the disorder, which mostly affects girls and women. The new study "hammers home the fact that these are biologically based disorders," said Cintia Bulik, lead author of the study, who is a psychiatrist at the School of Medicine at University of North Carolina-Chapel Hill. We need to stop viewing them as a choice… The patients feel guilty; the providers tell them things like they should just eat; parents are blamed; the insurance companies won't fund treatment because they think it's a choice. It has held us back for decades.

18. The above paragraph would most likely be published in which of the following?

a. Teen magazine
b. History textbook
c. World politics
d. Journal of American Medical Association

People loved to come to the Grogrande Bakery. When one opened the door an exquisite fragrance of newly baked bread and cakes greeted the nostrils; and, if you were not hungry when you entered, you were sure to become so when you examined and smelled the delicious pies and doughnuts and gingerbread and buns with which the shelves and show-cases were stocked. There were trays of French candies, too; and because all the goods were fresh and wholesome the bakery was well patronized and did a thriving business.

19. What is the main idea of this passage?

a. People love to eat bread.
b. People loved to come to the Grogrande Bakery.
c. Gingerbread is delicious.
d. The Grogrande bakery made a ton of money.

20. How is the information organized?

a. In chronological order
b. As a descriptive list
c. A series of questions and answers
d. From most important to least important

21. Which word best defines the function of the passage?

a. interrogative
b. exclamatory
c. descriptive
d. persuasive

22. What kind of text would this passage likely appear in?

a. magazine article
b. story
c. editorial
d. letter

23. Who is the likely audience for this passage?

a. bakers
b. children
c. gingerbread men
d. retired citizens

24. The author's main purpose in writing this selection was to:

a. Persuade people to buy delicious treats from the bakery
b. Inform the audience about what the bakery looked like
c. Inform the audience about the options available for purchase
d. Entertain people with a story about a bakery

25. What does the author mean by 'well-patronized'?

a. The bakery got its water from a well.
b. Very few people shopped there.
c. A large number of people shopped there.
d. The bathroom sink was always clean.

Read the passage and answer the questions that follow.

"I am sorry you have lost the watch, Luke," said the teacher, after Randolph's departure. "You will have to be satisfied with deserving it."
"I am reconciled to the disappointment, sir," answered Luke. "I can get along for the present without a watch."
Nevertheless, Luke did feel disappointed. He had fully expected to have the watch to carry home and display to his mother. As it was, he was in no hurry to go home, but remained for two hours ice skating with the other boys. He used his friend Linton's skates, Linton having an engagement which prevented his remaining.
It was five o'clock when Luke entered the little cottage which he called home. His mother, a pleasant woman of middle age, was spreading the cloth for supper. She looked up as he entered.
"Well, Luke?" she said inquiringly.
"I haven't brought home the watch, mother," he said. "Randolph Duncan won it by accident. I will tell you about it."

26. According to this passage, Luke is disappointed because:

a. He has to go home without skating.
b. He did not win the watch.
c. His teacher does not like him.
d. He has won a watch.

27. Why does Luke mean when he claims that Randolph won the watch by accident?

a. Randolph wasn't trying to win the watch, it just happened he was the victor.
b. Randolph cheated and won the watch.
c. Luke let Randolph win because he felt bad for him.
d. Luke didn't really want to win.

28. Why is the teacher sorry that Luke has lost the watch?

a. He feels that Luke deserves the watch.
b. He likes Luke better than the other students.
c. He knew Luke needed a watch.
d. He dislikes the boy who has won the watch.

29. During what time of year does this passage take place?

a. winter
b. Christmas
c. summer
d. spring

30. How old might Luke be?

a. 3
b. 12
c. 25
d. 40

31. What does the word present mean in the passage?

a. to introduce formally
b. a gift
c. the current moment or period of time
d. to bring before a group of people

Read the passage and answer the questions that follow.

According to a report of the National Campaign to Prevent Teen Pregnancy, 20 percent of adolescents have had sex before their fifteenth birthday. The report also revealed that only a third of these adolescents' parents know that their children are sexually active. Such alarming statistics should cause us to wonder what in the world is wrong with these parents. Why don't two-thirds of them know what their own children are doing? Are the parents simply too lazy or self-absorbed to concern themselves with how their own kids are spending their free time? Whatever the reason for parent' apathy and ignorance, it's the kids who will ultimately pay the price. Thanks to parents who won't get their heads out of the sand and watch their own kids, America's young people are growing up much too fast.

32. The tone in the above passage could best be described as:
a. angry
b. solemn
c. sorrowful
d. objective

33. It is clear the author is:

a. Trying to persuade parent to watch their children
b. Trying to inform people that young people lack moral values
c. Trying to persuade people that sex education should indeed be taught in the schools
d. Trying to inform parents that peer pressure has increased.

Read the passage and answer the question that follows.

Grandson and the Fish Chief
A tale from Native Americans of the Great Lakes region

Grandmother was irritated when she ran out of fish oil so she called upon her grandson for help. "Grandson," she said, "travel to the Great Lake in the North and bring me the biggest fish in the world so I never again run out of fish oil."
Grandson felt beholden to his grandmother who had raised him from early childhood. Now a giant of a man, he was not a bit daunted by the gigantic size of the fish that his grandmother desired. So Grandson constructed a special canoe, threw in his paddles, poles, lines, nets, and bait along with his drum, and headed upriver.
The river ran into the Great Lake, but Grandson kept paddling until he felt certain that he had reached his destination. Then he baited his line, put it into the water, and called out to Fish Chief, "Come up and get my bait."
Fish Chief ignored Grandson, but Grandson was determined. He bellowed, "Fish Chief must be a coward if he refuses to face me."
Upon hearing these words, Fish Chief got annoyed, so he sent Big Trout up to the surface to terrify Grandson. Grandson, who was not the least bit intimidated, threw a paddle at Big Trout that left him bruised and defeated.
Upon seeing Big Trout's swollen jaw, Fish Chief got even more irritated, and this time he sent Giant Pike. Grandson was still unimpressed as he threw a second paddle at Giant Pike, nearly killing him.
By now, Fish Chief was exasperated, so this time he raced to the surface of the lake himself and gulped down Grandson, the big canoe, and all of Grandson's equipment in one mighty gulp.
The inside of Fish Chief's belly was as dark as a cave at midnight. Grandson thought he was certainly a goner, especially when he heard Fish Chief's giant heart

hammering louder than all of the drums of his village. The earsplitting beat terrified Grandson until he got used to it, and then it gave him an idea. He recalled his own drum that Fish Chief had swallowed along with the canoe and everything else, and so he found the drum and began banging it as loudly as he could. The water of the lake amplified his drumbeat, and the thunderous noise scared Fish Chief to death.
When Fish Chief stopped moving, Grandson managed to make his way with his canoe and dragged it through Fish Chief's belly and out of his mouth. Then he attached a long rope to the enormous fish and dragged it behind him up the lake, down the river, and back to his village. Grandmother, along with a large crowd, welcomed Grandson when he arrived, and there was enough oil for all the people of the village until the end of time.

34. The narrative point of view in this story is best described as:

a. first-person, through the eyes of Fish Chief.
b. first-person, through the eyes of Grandson.
c. third-person, through the eyes of Grandson.
d. third-person, through the eyes of Grandmother.

Comma Splices

Read the following sentences and select the best version.

35. Herb talks too much nobody seems to mind.

a. No correction – the sentence is written correctly.
b. Herb talks too much, yet nobody seems to mind.
c. Herb talks too much; and nobody seems to mind.
d. Herb talks too much, nobody seems to mind.

36. Although millions of Americans are affected, when someone returns from substance abuse, his or her triumph can encourage others to seek help.

a. No correction – the sentence is written correctly.
b. Although millions of Americans are affected when someone returns, from substance abuse, his or her triumph can encourage others to seek help.
c. Although millions of Americans are affected when someone returns from substance abuse; his or her triumph can encourage others to seek help.
d. Although millions of Americans are affected when someone returns from substance abuse his or her triumph can encourage others to seek help.

37. Researchers tested 63 students, they wanted to study the effects of insomnia.

a. No correction – the sentence is written correctly.
b. Researchers, tested 63 students, they wanted to study the effects of insomnia.
c. Researchers tested 63 students because they wanted to study the effects of insomnia.
d. Researchers tested 63 students, they wanted to study, the effects of insomnia.

Semicolons

Read the following sentences and select the best version.

38. Romeo and Juliet loved one another deeply, nevertheless, their families hated one another.

a. No correction – the sentence is written correctly.
b. Romeo, and Juliet, loved one another deeply nevertheless; their families hated one another.
c. Romeo and Juliet loved one another deeply nevertheless; their families hated one another.
d. Romeo and Juliet loved one another deeply; nevertheless, their families hated one another.

39. Channel 20 televised a special about gorillas, I did not get home in time to see it.

a. No correction – the sentence is written correctly.
b. Channel 20 televised a special about gorillas; however, I did not get home in time to see it.
c. Channel 20 televised a special about gorillas; however I did not get home in time to see it.
d. Channel 20 televised a special about gorillas, however, I did not get home in time to see it.

40. If I climbed mountains, I would hike in the Rockies. I don't climb mountains, however.

a. No correction – the sentence is written correctly.
b. If I climbed mountains, I would hike in the Rockies. I don't climb mountains; however.
c. If I climbed mountains; I would hike in the Rockies, I don't climb mountains, however.
d. If I climbed mountains I would hike in the Rockies. I don't climb mountains; however.

Subordination

Read the following sentences and select the correct word to fill in the blank.

41. _____ the ring is a very old symbol, the elaborate wedding cake is even older.

a. Whenever
b. Although
c. Whether
d. Unless

42. Specifically describe what you did _____ you reveal an understanding of your offense and its impact.

a. since
b. wherever
c. so that
d. as though

43. _____ you write that article, you should get all the facts.

a. While
b. Because
c. Since
d. Before

Subject-Verb Agreement

Choose the word or words that best complete the sentence.

44. The players and their coach _____ to meet an hour before the game.

a. plans
b. will plan
c. has made plan
d. plan

45. Juan, the youngest of my brothers, _____ for the award.

a. has been chosen
b. have been chosen
c. was choosed
d. were chosen

46. Everyone in the audience, including the children, _____ sitting quietly.

a. was
b. were
c. are
d. have been

Verb Tense

47. Until it was actually mapped, only a few people _____ the true location of the tunnel.

a. knew
b. had known
c. have known
d. will know

48. Moments after the clock struck midnight, the boy _____ downstairs as quietly as possible.

a. creeps
b. creeping
c. crept
d. creep

49. In New York City, the Mohawk Indians proudly _____ their place in history, working on the Chrysler Building, the Empire State Building, and the George Washington Bridge.

a. taked
b. takes
c. are taking
d. took

Modifiers

Select the best version of the sentence.

50. Eagerly awaiting her birthday, Mary's presents were all picked up and admired by her many times throughout the course of the day.

a. No change – the sentence is correct.
b. Eagerly awaiting her birthday throughout the day, Mary's presents were picked up and admired by her.
c. Eagerly awaiting her birthday, Mary picked up and admired her presents many times throughout the day.
d. Mary's presents were picked up and admired all day, eagerly awaiting her birthday throughout the day.

51. Exploding noisily, I saw the fireworks in the sky.

a. No change – the sentence is correct.
b. Exploding noisily in the sky, I saw fireworks.
c. I saw the fireworks exploding noisily in the sky.
d. I saw the fireworks in the sky, exploding noisily.

52. She served sandwiches to the children on paper plates.

a. No change – the sentence is correct.
b. She served the children sandwiches on paper plates.
c. To the children on paper plates she served sandwiches.
d. She served, on paper plates, sandwiches to the children.

Pronoun and Antecedent/Pronoun Shifts

Choose the word that best completes the sentence.

53. Theresa alleges that Michael and _____ witnessed a robbery in the city last night.

a. she
b. he
c. her
d. him

54. Neither Mary nor Laura has turned in _____ report.

a. their
b. she
c. her
d. they

55. The team can't play (its, their) best when it's too hot.

a. their
b. our
c. they're
d. its

56. Which of the following sentences is written correctly?

a. Each employee of the hospital is permitted to talk about individual patients, but it must do so only in the company of the other employees.
b. Each member of the hospital is permitted to talk about individual patients, but they must do so only in the company of the other employees.
c. Each employee of the hospital is permitted to talk about individual patients, but we must do so only in the company of the other employees.
d. Each employee of the hospital is permitted to talk about individual patients, but he or she must do so only in the company of the other employees.

57. Which of the following sentences is written correctly?

a. It is not easy for teachers to keep their lectures and classroom presentations interesting; you have to spice them up with colorful visuals, and having a sense of humor doesn't hurt either.
b. It is not easy for teachers to keep their lectures and classroom presentations interesting; he or she has to spice them up with colorful visuals, and having a sense of humor doesn't hurt either.
c. It is not easy for teachers to keep their lectures and classroom presentations interesting; they have to spice them up with colorful visuals, and having a sense of humor doesn't hurt either.
d. It is not easy for teachers to keep their lectures and classroom presentations interesting; we have to spice them up with colorful visuals, and having a sense of humor doesn't hurt either.

58. Which of the following sentences is written correctly?

a. Students often suffer when professors force \ them to write in class. For example, you get the sweats, and then your mind goes blank.
b. Students often suffer when professors force them to write in class. For example, they get the sweats, and then your mind goes blank.
c. Students often suffer when professors force them to write in class. For example, they get the sweats, and then their mind goes blank.
d. Students often suffer when professors force them to write in class. For example, he or she get the sweats, and then their mind goes blank.

Adjectives and Adverbs

Choose the word or words that best complete the sentence.

59. Due to hospital policy, visitors must set cell phones to vibrate and speak _____ in conversation.

a. quieter
b. more quiet
c. quietly
d. more quieter

60. The trail was _____ that we expected.

a. rockier
b. more rockier
c. more rocky
d. rocky

61. This baby makes the _____ gurgling noises we have ever heard.

a. most odd
b. more odd
c. oddest
d. most oddest

Essay Writing

Students will be required to respond, in writing, to pre-determined prompt. This writing will take the form of a properly structured essay. The score is determined by how well-organized and developed the student response is to the prompt. The following characteristics of writing will be considered:

- **Focus and Meaning**
  How clear is the main idea or point of view?

- **Content and Development**
  How well do you expand on your ideas? Have you offered proper support in the form of details, arguments, and/or examples?

- **Organization**
  Have you used well-structured sentences? Are you using academic language? Is the vocabulary use appropriate?

- **Language Use and Style**
  Do you use the correct convention of the English language? Is the essay free of typographical, grammar, and punctuation errors?

Use the following prompts to practice writing an essay. These prompts do not reflect the actual question found on the test.

1. Technology and the changes it brings can have a very big effect on our lives. Which technology has had a significant effect on life in this country? Why?

2. If you founded your own college or university, what topic of study would you make mandatory for all students to study and why? What would be the values and priorities of your institution and why?

3. Write an essay in which you argue for legislation that would change the driving age from sixteen to eighteen.

4. Think about the person you admire the most. You have been chosen to introduce this person to an audience. Who will that person be, and what will you say about that person?

When composing an essay, remember to:

- Include an introduction with a proper hook, bridge, and thesis.
- Offer body paragraphs of appropriate length.
- Wrap up your writing with a conclusion that restates the thesis and summarizes the content of the essay.
- Proofread the draft for any potential errors such as typographical mistakes, misspelled words, and improper punctuation.

Essay Worksheet

Basic Facts Practice Problems (Page 3)	
Question #	**Correct Answer**
1	17
2	26
3	20
4	$\frac{13}{15}$

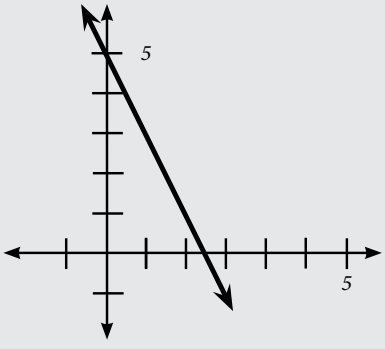
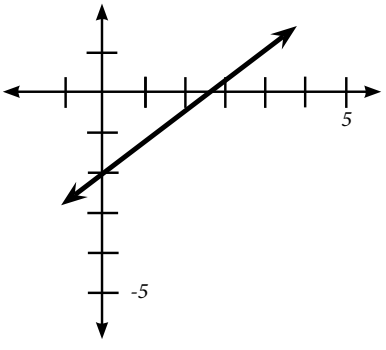
Substitution Practice Problems (Page 4)	
Question #	**Correct Answer**
1	-12
2	108
3	31
4	*The solution checks.*
5	*The solution does not check.*
6	*The solution checks.*

Linear Equations Practice Problems (Page 6)	
Question #	**Correct Answer**
1	$x = -9$
2	$x = 22$
3	$x = 3$
4	$x = \frac{14}{3}$
5	$x = 5$
6	$x = 3$
7	$x = \frac{1}{3}$
8	$x = -3$

Polynomial Practice Problems (Page 9)	
Question #	**Correct Answer**
1	$-12x^2 - 4x + 15$
2	$35x^3 - 9x^2 + 31x - 4$
3	$12x^4 - 8x^3 + 2x^2$
4	$6x^2 + 19x - 7$
5	$3x^2 - \frac{1}{3}x + 1$

Factoring Polynomials Practice Problems (Page 11)	
Question #	**Correct Answer**
1	$3x^2(2x^3 + 3x^2 - 8x + 6)$
2	$(x - 8)(x + 4)$
3	$(3x - 1)(x + 5)$
4	$x = 0, \frac{4}{3}$
5	$x = 7, -4$
6	$x = -1, \frac{7}{2}$

Fractions Practice Problems (Page 14)	
Question #	**Correct Answer**
1	$\frac{4}{5}$
2	$\frac{4}{5}$
3	$\frac{3}{4}$
4	$\frac{7}{3}$
5	$\frac{38}{7}$
6	$7\frac{1}{3}$
7	$2\frac{3}{8}$
8	$\frac{4}{3}$
9	$\frac{1}{4}$
10	$\frac{3}{2}$
11	$\frac{4}{5}$
12	$\frac{17}{20}$
13	$\frac{7}{9}$
14	$\frac{1}{12}$
15	$\frac{2}{15}$

Graphing Lines Practice Problems (Page 17)	
Question #	**Correct Answer**
1	$m = -1$
2	$m = \frac{9}{4}$
3	$m = -3, (0, 4)$
4	$m = \frac{2}{3}, (0, -\frac{5}{7})$
5	
6	

Reading and Writing (Pages 19 – 27)			
Question #	**Correct Answer**	**Question #**	**Correct Answer**
1	C	32	A
2	D	33	A
3	C	34	C
4	B	35	B
5	C	36	A
6	C	37	C
7	D	38	D
8	C	39	B
9	C	40	A
10	D	41	B
11	A	42	C
12	B	43	D
13	D	44	D
14	B	45	A
15	D	46	A
16	B	47	B
17	B	48	C
18	D	49	D
19	B	50	C
20	B	51	C
21	C	52	B
22	B	53	A
23	B	54	C
24	B	55	D
25	C	56	D
26	B	57	C
27	B	58	C
28	A	59	C
29	A	60	A
30	B	61	C
31	C		