Decatur City Schools

Decatur, Alabama

Mathematics Department

Summer Course Work

In preparation for

Algebra II with Trig

Completion of this summer work

is required on the first class day

of the 2019-2020 school year.

Student Name:________________________________

Decatur City Schools
Mathematics Department

Summer Workbook
Algebra II with
Trig

Topics

1. Algebraic Expressions
2. Linear Equations
3. Solving Systems (substitution, elimination)
4. Roots and Simplifying Radicals
5. Laws of Exponents
6. Multiplying Polynomials
7. Factoring

All pages MUST show the work in order for the work to be accepted. If more paper is needed, the work may go on the back of each page or neatly on a separate page.

Completion of this booklet is required by the first class day of the school year.

*****If you do not remember something, look it up. Use resources such as, Khan Academy, Google, YouTube, etc.**

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Dear Parents and Guardians:

Attached are the summer curriculum review materials for *Algebra II with Trig*. This booklet was prepared by the Decatur City Schools Math Department and contains topics that reflect content learned in prerequisite courses. These materials must be completed and brought to class on the first class day of school.

Your child is required to complete this booklet over the summer. A test based on the material in the packet will be given to your child during the second week of school. It will count as the first test of the year and the grade will be determined as follows:

> Completion of the packet on time will count 20% of the grade
> Performance on the test will count 80% of the grade.

Thank you for your cooperation.

Sincerely,

Decatur City School Mathematics Department

Evaluating Algebraic Expressions

To evaluate an algebraic expression:

- **Substitute the given value(s) of the variable(s).**
- **Use order of operations to find the value of the resulting numerical expression.**

Evaluate.

1) $x\left(\frac{y}{2}+3z^2\right)-2x \; if \;\; x=\frac{1}{2},\; y=4,\;\; z=-2$

2) $12a - 4a^2 + 7a^3$ if $a = -3$

Simplifying Radicals

An expression under a radical sign is in simplest radical form when:

1) there is no integer under the radical sign with a perfect square factor,
2) there are no fractions under the radical sign,
3) there are no radicals in the denominator

Express the following in simplest radical form.

1) $\sqrt{50}$ _____ 2) $\sqrt{72}$ _____ 3) $\sqrt{192}$ ______ 4) $\sqrt{169}$ _____ 5) $\sqrt{147}$ _______

Properties of Exponents – MEMORIZE!!!!

PROPERTY		EXAMPLE
Product of Powers	$a^m \bullet a^n = a^{m+n}$	$x^4 \bullet x^2 = x^6$
Power of a Power	$(a^m)^n = a^{m \bullet n}$	$(x^4)^2 = x^8$
Power of a Product	$(ab)^m = a^m b^m$	$(2x)^3 = 8x^3$
Negative Power	$a^{-n} = \frac{1}{a^n} \quad (a \neq 0)$	$x^{-3} = \frac{1}{x^3}$
Zero Power	$a^0 = 1 \quad (a \neq 0)$	$4^0 = 1$
Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n} \quad (a \neq 0)$	$\frac{x^3}{x^2} = x^1 = x$
Power of Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad (b \neq 0)$	$\left(\frac{x}{y}\right)^3 = \frac{x^3}{y^3}$

Simplify each expression. Answers should be written using positive exponents.

1) $g^5 \bullet g^{11}$ __________

2) $(b^6)^3$ __________

3) w^{-17} __________

4) $\frac{y^{12}}{y^8}$ __________

5) $(3x^7)(-5x^{-3})$ __________

6) $(-9z^3bcd^0)^5$ __________

7) $\frac{-15x^7y^{-2}}{25x^{-9}y^5}$ __________

8) $\left(\frac{4x^9}{12x^4}\right)^3$ __________

Solving Linear Equations

To solve linear equations, first simplify both sides of the equation. If the equation contains fractions, multiply the equation by the LCD to clear the equation of fractions. Use the addition and subtraction properties of equality to place variables on one side and constants on the other side of the equal sign. Use the multiplication and division properties of equality to solve for the variable. Express all answers as fractions in lowest terms or round decimals to the tenths place where appropriate.

Completed examples:

a) $3(x + 5) + 4(x + 2) = 21$
$3x + 15 + 4x + 8 = 21$
$7x + 23 = 21$
$7x = -2$
$x = -\frac{2}{7}$

b) $2(5x - 4) - 10x = 6x + 3(2x - 5)$
$10x - 8 - 10x = 6x + 6x - 15$
$-8 = 12x - 15$
$7 = 12x$
$\frac{7}{12} = x$

c) $\frac{2}{3}x + 5 = 6x - \frac{3}{4}$
$12\left(\frac{2}{3}x + 5 = 6x - \frac{3}{4}\right)$
$8x + 60 = 72x - 9$
$69 = 64x$
$\frac{69}{64} = x$

Solve for the indicated variable. Circle your answers.

1) $5 + 2(k + 4) = 5(k - 3) + 10$

2) $\frac{1}{2}x - 8 = 3$

3) $\frac{1}{3} + \frac{4}{6}y = \frac{2}{3}$

Operations With Polynomials

To add or subtract polynomials, just combine like terms.

To multiply polynomials, multiply the numerical coefficients and apply the rules for exponents for variables.

Perform the indicated operations and simplify. Circle your answers.

1) $(7x - 3)(3x + 7)$

2) $(5x^2 - 4) - 2(3x^2 + 8x + 4)$

Graphing Linear Equations

Formulas: Slope formula | Slope – Intercept form | Point-Slope form

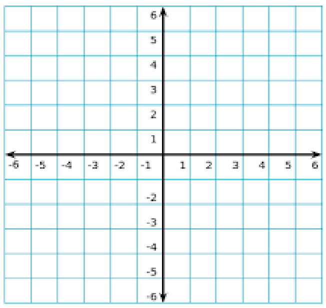
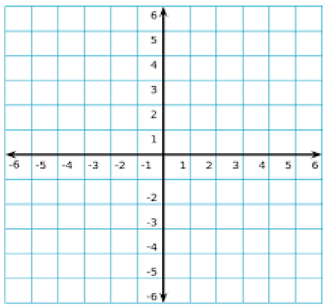
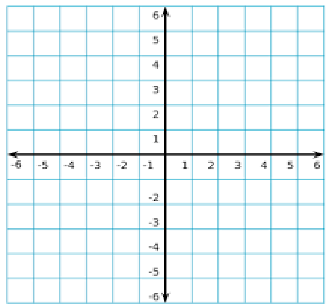
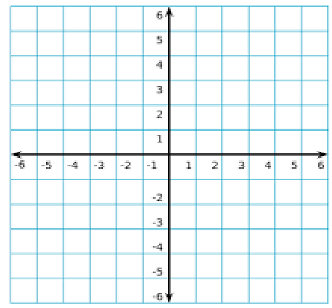
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$y = mx + b$$

$$y - y_1 = m(x - x_1)$$

Graph the following equations:

1. $y = 3x - 5$
2. $2x + 3y = 6$
3. $y = 3$
4. $x - 2$

Write the equation of the lines described below. Give each answer in slope-intercept form.

1. slope = 4 and y-intercept = -2

2. slope = 5 and the line passes through (-2, 3)

3. the line passes through (2, 5) and (-3, 15)

Solving Systems of Equations

Solve for x and y: x = 2y + 5 3x + 7y = 2 Using **substitution** method: 3(2y + 5) + 7y = 2 6y + 15 + 7y = 2 13y = -13 y = -1 x = 2(-1) + 5 x=3 Solution: (3, -1)	Solve for x and y: 3x + 5y = 1 2x + 3y = 0 Using **elimination** method: 3(3x + 5y = 1) -5(2x + 3y = 0) 9x + 15y = 3 -l0x - 15y = 0 -1x = 3 x = -3 2(-3) + 3y = 0 y=2 Solution: (-3, 2)

Solve each system of equations by either the substitution method or elimination method. Write your answer as an ordered pair.

1) $y = 2x + 4$
   $-3x + y = -9$

2) $2x + 3y = 6$
   $-3x + 2y = 17$

Factoring

Factoring is used to represent quadratic equations in the **factored form** of $a(x - p)(x - q) = 0$, and solve this equation.

Factoring GCF

In a quadratic equation you may factor out the Greatest Common Factor.

Ex. 1: $16x^2 + 8x = 0$ — GCF = 8x

$8x(2x + 1) = 0$ — Zero Product Property

$8x = 0$ OR $2x + 1 = 0$

$x = 0$ OR $x = -1/2$

Factoring when a = 1

Ex. 2: $x^2 + 9x + 20 = 0$ — To factor we want to find two numbers that multiply to be 20 and add to be 9.

$(x + 5)(x + 4) = 0$ — $5 + 4 = 9$ and $5*4 = 20$

$(x + 5) = 0$ OR $(x + 4) = 0$ — Zero Product Property

$x = -5$ or $x = -4$.

Solve each equation.

1. $20x^2 + 15x = 0$

2. $x^2 - 16x + 64 = 0$

3. $x^2 - 4x - 21 = 0$