

SUMMER WORK
for
Algebra 2 & Advanced Alg/Trig

Mathematician: _____

Directions: The concepts covered in this packet are skills that students should have mastered in Algebra 1. If you are drawing a blank, please refer to the problems that have already been completed for you.

Rationale: The math course you are starting on August 16th has some expectations about what you've learned BEFORE you start. Therefore, ***we ask that you work on the skills in this packet in the weeks leading up to the start of the 2023-24 school year*** to be better prepared for this course. The skills include:

- (1) following order of operations appropriately in all situations
- (2) adding, subtracting, & multiplying polynomials
- (3) solving a variety of linear equations

Resources: For each even numbered problem you need to complete, there is an odd-numbered example problem worked out in detail. If that's not enough to guide your work, then we suggest you google the topic you are struggling with or go to one of the following websites & search the topic...

<https://www.youtube.com/channel/UCcfzvi8xPFQToNua6HRDflA/playlists> (English & Spanish Videos)

<https://www.khanacademy.org/>

<http://www.purplemath.com/>

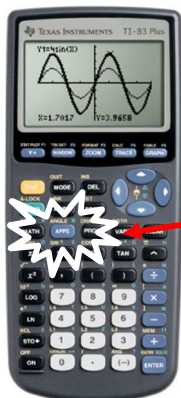
<http://www.mathgoodies.com/students.html>

This packet will count as a grade, so please take the time to complete these problems.

(OVER)

A requirement of this course is that you purchase a graphing calculator. Although these can be expensive, we will use it in *every* unit to supplement the content that is being learned. Below are *suggested* calculators that are appropriate to use in Algebra 2 and can be used in subsequent years through college level math courses.

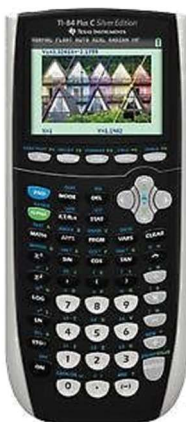
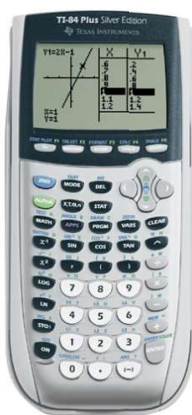
TI - 83+



If you purchase a TI - 83, it needs to be a plus (+) model. You will need the blue/purple “APPS” key.

This is the button we are looking for.

TI - 84/TI - 84+



These calculators come in various models, as they have been updated over the years. ANY TI - 84 is appropriate. It can be a plus (+) model, a C or CE model or a silver edition model. It can also have a black and white screen or a color screen. The most efficient calculators are the newest thinner calculators with a color screen.

It is highly recommended to purchase one of these calculators as soon as possible, as they do sell out quickly at the beginning of the school year.

Thank you,

Mrs. Coletta
Mr. Dorado
Mrs. Lu
Ms. Perez
Mr. Strzelczyk
Mr. Sullivan

(WB Alg2 & AAT Teachers for 2023-24)

ORDER OF OPERATIONS	GROUPING SYMBOLS (P)	EXPONENTS & ROOTS (E)	MULTIPLICATION & DIVISION (M) (D)	ADDITION & SUBTRACTION (A) (S)
<i>Handwritten:</i> Parentheses Exponents multiplication Division Addition Subtraction	Parentheses () OR Brackets [] Absolute values	Exponents Ex: $3^2 \Rightarrow 3 \cdot 3 = 9$ OR Roots Ex: $\sqrt{25} = 5$	MUST be done from LEFT to RIGHT!! Ex: $18 \div 6 \cdot 3$ $\begin{array}{r} 3 \cdot 3 \\ \hline 9 \end{array}$	MUST be done from LEFT to RIGHT!! Ex: $4 - 2 + 7$ $\begin{array}{r} 2 + 7 \\ \hline 9 \end{array}$

#1 - 5: Evaluate.

1a. $4 + 3 \cdot 4 \div 2 - 9$

$$4 + 12 \div 2 - 9$$

$$4 + 6 - 9$$

$$10 - 9$$

$$\boxed{1}$$

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

$$4 + 3(-1)^2$$

$$4 + 3(1)$$

$$4 + 3$$

$$\boxed{7}$$

3a. $(2x)^2 - y$ when $x = 3$, $y = 17$

$$(2(3))^2 - 17$$

$$(6)^2 - 17$$

$$36 - 17$$

$$\boxed{19}$$

4a. $\frac{1}{2}(x - 7) - 3x$ when $x = -11$

$$\frac{1}{2}(-11 - 7) - 3(-11)$$

$$\frac{1}{2}(-18) - 3(-11)$$

$$-9 + 33$$

$$\boxed{24}$$

1b. $18 - 12 \div 6 \cdot 2 - 10$

2b. $20 - (7 + (-9))^2 \cdot 3$

3b. $3x - 4y^3$ when $x = 7$, $y = -1$

4b. $b^2 - 4ac$ when $a = 2$, $b = -3$, $c = -1$

5a. $\frac{3b-a}{b+a}$ when $a = 3$, $b = -4$

$$\frac{\underline{3(-4)} - 3}{-4 + 3}$$

$$\frac{\underline{-12 - 3}}{\underline{-4 + 3}}$$

$$\frac{-15}{-1}$$

$$\boxed{15}$$

5b. $\frac{4b+2a}{2b}$ when $a = 3$, $b = -4$

ADDING & SUBTRACTING POLYNOMIALS**RULES:**

- **Distribute** to eliminate parenthesis (if necessary)
- **Combine like terms** by adding the coefficients of terms with the same variable & same exponent

EX 1: $(x^3 + 6x^2 - 1) + (-x^3 + 7x^2 - 7)$
 $\cancel{x^3} + 6x^2 - 1 - \cancel{x^3} + 7x^2 - 7$
 $13x^2 - 8$

EX 2: $4m^2 - (-8m + 3m^2 - 2)$
 $4m^2 + 8m - 3m^2 + 2$
 $m^2 + 8m + 2$

MULTIPLYING POLYNOMIALS**RULES:**

- **Distribute/Multiply** each term from the 1st polynomial with each term of the 2nd polynomial.
(add the exponents of same bases)
- **Combine like terms** if possible

EX 3: $-4x(x^3 + 6x^2 - 1)$
 $-4x^4 - 24x^3 + 4x$

EX 4: $(m + 4)(2m - 1)$
 $2m^2 - m + 8m - 4$
 $2m^2 + 7m - 4$

#6 - 9: Simplify.

6a. $\boxed{x} - x^2 + 3x^2 + \boxed{5x}$
 $2x^2 + 6x$

7a. $6y - 2(3y - 8) + 2y$
 $\underline{6y} - \underline{6y} + \underline{16} + \underline{2y}$
 $2y + 16$

8a. $(4 + x)(x - 3)$
 $\underline{4x} - \underline{12} + \underline{x^2} - \underline{3x}$
 $x^2 + x - 12$

9a. $(2 + 3x)^2$
 $(2 + 3x)(2 + 3x)$
 $\underline{4} + \underline{6x} + \underline{6x} + \underline{9x^2}$
 $9x^2 + 12x + 4$

6b. $4x^2 - 3x + 5x - 6x^2$

7b. $5m - 3m(m + 2) + 5m^2$

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

9b. $(2x - 5)^2$

Solving Multi-Step Equations (Checklist)	Example:
<ul style="list-style-type: none"> <u>Distribute</u> <u>Combine like terms</u> on either side of the "=" <u>Move variable to one side of "="</u> (Smaller Variable Term) <u>Solve</u> using SADMEP 	$3(x+1) = 6x + 9 + 3x$ $3x + 3 = \underline{6x} + 9 + \underline{3x}$ $3x + 3 = 9x + 9$ $\begin{array}{r} -3x \quad -3x \\ 3 = 6x + 9 \end{array}$ $\begin{array}{r} -9 \quad -9 \\ -6 = 6x \end{array}$ $\underline{-6 = 6x}$ $-1 = x$ <div style="border: 2px solid red; padding: 5px; display: inline-block; margin-top: 10px;">$x = -1$</div>

#10 - 16: Solve.

10a. $4x - 3 = 9$

$$\begin{array}{r} 4x - 3 = 9 \\ +3 \quad +3 \\ \hline 4x = 12 \\ \underline{4 \quad 4} \\ x = 3 \end{array}$$

10b. $3 - 5x = 16$

11a. $3x - 6 = 5x + 12$

$$\begin{array}{r} 3x - 6 = 5x + 12 \\ -3x \quad -3x \\ \hline -6 = 2x + 12 \\ -12 \quad -12 \\ \hline -18 = 2x \\ -9 = x \end{array}$$

11b. $16 - 8x = 4x + 6$

12a. $-3(2x + 5) = 20$

$$\begin{array}{r} -3(2x + 5) = 20 \\ -6x - 15 = 20 \\ +15 \quad +15 \\ \hline -6x = 35 \\ \underline{-6 \quad -6} \\ x = -\frac{35}{6} \end{array}$$

12b. $4(3x - 7) = -40$

$$13a. 2(4-x) = 16 + 2x$$

$$8 - 2x = 16 + 2x$$

$$\begin{array}{r} +2x \quad +2x \\ \hline \end{array}$$

$$8 = 16 + 4x$$

$$\begin{array}{r} -16 \quad -16 \\ \hline \end{array}$$

$$\begin{array}{r} -8 = 4x \\ \hline \end{array}$$

$$\begin{array}{r} -2 = x \end{array}$$

$$13b. 5x - 20 = 6(2x + 1)$$

$$14a. 4 - 3(4x + 6) = 1$$

$$4 - 12x - 18 = 1$$

$$-12x - 14 = 1$$

$$\begin{array}{r} +14 \quad +14 \\ \hline \end{array}$$

$$-12x = 15$$

$$\begin{array}{r} -12 \quad -12 \\ \hline \end{array}$$

$$x = -\frac{5}{4}$$

$$14b. 18 = 10 - 2(2x + 3)$$

$$15a. 5(3x - 2) + 10 = 2(5 - 6x)$$

$$15x - 10 + 10 = 10 - 12x$$

$$15x = 10 - 12x$$

$$\begin{array}{r} +12x \quad +12x \\ \hline \end{array}$$

$$27x = 10$$

$$\begin{array}{r} 27 \quad 27 \\ \hline \end{array}$$

$$x = \frac{10}{27}$$

$$15b. 20 + 8(3 + 4x) = -3(6x - 5)$$

$$16a. \left(\frac{2}{3}m + 5 = 4m - 9\right) 3$$

$$2m + 15 = 12m - 27$$

$$\begin{array}{r} -2m \quad -2m \\ \hline \end{array}$$

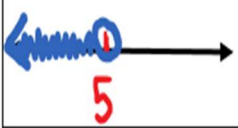
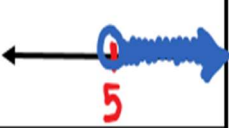


$$15 = 10m - 27$$

$$\begin{array}{r} +27 \quad +27 \\ \hline \end{array}$$



$$\frac{42}{10} = \frac{10m}{10}$$

$$\frac{21}{5} = m$$

$$16b. 4 - \frac{5}{6}x = \frac{1}{2}x + 2$$

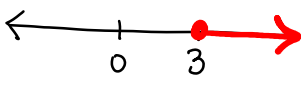
	SHADE LEFT	SHADE RIGHT
OPEN CIRCLE	$<$	$>$
CLOSED CIRCLE	\leq	\geq
EXAMPLES	$x < 5$ 	$x > 5$ 
	$x \leq 5$ 	$x \geq 5$ 

SPECIAL RULES FOR INEQUALITIES

FLIP! (When multiplying or dividing by a negative)	REWRITE! (When variable is on the right side of the inequality)
$13 - 2a < 7$ $-13 \quad -13$ $-2a < -6$ $-2 \quad -2$ $a > 3$ FLIP!	$23 \geq 7 + 8a$ $-7 \quad -7$ $16 \geq 8a$ $8 \quad 8$ $2 \geq a$ $a \leq 2$ REWRITE!
	

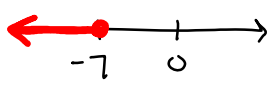
#17 - 22: Solve and graph on a number line.

17a. $x + 4 \geq 7$
 $-4 \quad -4$
 $x \geq 3$



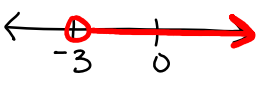
17b. $x - 3 < 5$

18a. $2x + 5 \leq -9$
 $-5 \quad -5$
 $2x \leq -14$
 $2 \quad 2$
 $x \leq -7$



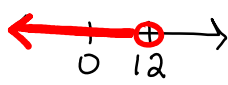
18b. $4 + 3x \geq 19$

19a. $3 - x < 6$
 $-3 \quad -3$
 $-x < 3$
 $-1 \quad -1$
 $x > -3$







19b. $2 - 3x \geq 14$

20a. $5x - 6 < 3x + 18$
 $-3x \quad -3x$
 $2x - 6 < 18$
 $+6 \quad +6$
 $2x < 24$
 $2 \quad 2$
 $x < 12$



20b. $3x + 5 > 6x - 12$

COMPOUND INEQUALITIES	
"AND"	"OR"
$\begin{array}{r} -4 \leq 3x - 7 < 8 \\ +7 \quad +7 \quad +7 \\ \hline 3 \leq 3x < 15 \\ \hline 1 \leq x < 5 \end{array}$ 	$\begin{array}{r} 8x - 7 \leq 1 \text{ or } 3x + 4 > 19 \\ +7 \quad +7 \quad -4 \quad -4 \\ \hline 8x \leq 8 \text{ or } 3x > 15 \\ \hline x \leq 1 \text{ or } x > 5 \end{array}$ 
EASY WAY TO REMEMBER "AND" and "OR"	
	

21a. $5 < 3 + 2x \leq 11$

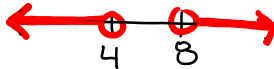
$$\begin{array}{r} -3 \quad -3 \quad -3 \\ \hline 2 < 2x \leq 8 \\ \hline 2 \quad 2 \quad 2 \\ \hline 1 < x \leq 4 \end{array}$$



21b. $19 > 5 - 2x > -7$

22a. $4 + 2x < 12 \text{ or } 5 - 2x < -11$

$$\begin{array}{r} -4 \quad -4 \quad -5 \quad -5 \\ \hline 2x < 8 \quad -2x < -16 \\ \hline 2 \quad 2 \quad -2 \quad -2 \\ \hline x < 4 \text{ or } x > 8 \end{array}$$



22b. $3 - 6x > 15 \text{ or } 5x - 3 \geq 12$

#23 - 28: Name the following polynomials using the vocabulary below.

Example	Degree	Name by Degree	Name by Terms
4	0	Constant	Monomial
$2x + 3$	1	Linear	Binomial
$3x - 4x^2 + 1$	2	Quadratic	Trinomial
$-6x^3 + 1$	3	Cubic	Binomial
x^6	4+	4 th degree ... etc.	Monomial

23. $3x^2 + 4x - 9$

24. $-2x$

25. $x^3 - 5x^2 + 4x - 7$

26. $-5x^3 + 7$

27. $3x + 12$

28. 6