ALGEBRA 2
SUMMER WORK

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 14th has some high expectations. Therefore, we are asking for you to work on the skills in this packet to be better prepared for this course. The skills include:

(1) follow order of operations appropriately in all situations
(2) add, subtract, & multiply polynomials
(3) solve a variety of linear equations

To refresh on these topics, you'll need to practice these skills in the weeks leading up to the beginning of the 2020 – 2021 school year.

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/

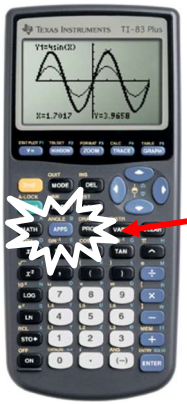
http://www.mathgoodies.com/students.html

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.

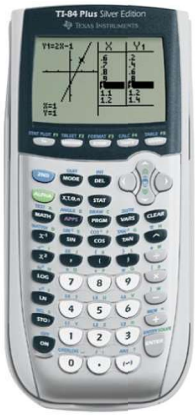
TI – 83+

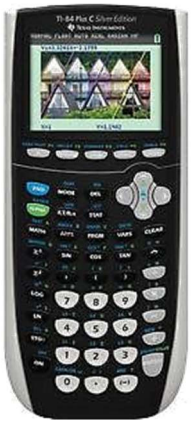


If you purchase a TI – 83, it needs to be a plus (+) model. You will need the blue/purple "APPS" key.

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,

Mr. Dorado
Mrs. Lu
Mr. Pennella
Ms. Skala

(WB Algebra 2 Teachers for 2019-2020)

ORDER OF OPERATIONS	GROUPING SYMBOLS (P)	EXPONENTS & ROOTS (E)	MULTIPLICATION & DIVISION (M) (D)	ADDITION & SUBTRACTION (A) (S)
Parenthesis Exponents Multiplication Division Addition Subtraction	*Parentheses* ( ) OR *Brackets* [ ] *Absolute values* | |	*Exponents* *Ex:* $3^2 \Rightarrow 3 \bullet 3 = 9$ *OR* *Roots* *Ex:* $\sqrt{25} = 5$	*MUST be done from LEFT to RIGHT!!* *Ex:* $18 \div 6 \bullet 3$ $3 \cdot 3$ 9	*MUST be done from LEFT to RIGHT!!* *Ex:* $4 - 2 + 7$ $2 + 7$ 9

#1 – 5: Evaluate.

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

$4 + 12 \div 2 - 9$

$4 + 6 - 9$

$10 - 9$

1

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

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

$4 + 3(-1)^2$

$4 + 3(1)$

$4 + 3$

7

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

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

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

$(6)^2 - 17$

$36 - 17$

19

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

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

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

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

$-9 + 33$

24

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

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

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

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

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

$$15$$

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: $(x^3+6x^2-1)+(-x^3+7x^2-7)$

$x^3+6x^2-1-x^3+7x^2-7$

$13x^2-8$

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

$2x^2+6x$

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

7a. $6y-2(3y-8)+2y$

$6y-6y+16+2y$

$2y+16$

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

8a. $(4+x)(x-3)$

$4x-12+x^2-3x$

x^2+x-12

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

9a. $(2+3x)^2$

$(2+3x)(2+3x)$

$4+6x+6x+9x^2$

$9x^2+12x+4$

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

Solving Multi-Step Equations (Checklist)	Example:
• Distribute • Combine like terms on either side of the "=" • Move variable to one side of "=" (Smaller Variable Term) • Solve using SADMEP	$3(x+1)=6x+9+3x$ $3x+3=6x+9+3x$ $3x+3=9x+9$ $-3x \quad -3x$ $3=6x+9$ $-9 \quad -9$ $\frac{-6}{6}=\frac{6x}{6}$ $-1=x$ $x=-1$

#10 – 16: Solve.

10a. $4x-3=9$

$+3 \quad +3$

$\frac{4x}{4}=\frac{12}{4}$

$x=3$

10b. $3-5x=16$

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

$-3x \quad -3x$

$-6=2x+12$

$-12 \quad -12$

$-18=2x$

$-9=x$

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

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

$-6x-15=20$

$+15 \quad +15$

$\frac{-6x}{-6}=\frac{35}{-6}$

$x=-\frac{35}{6}$

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

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

$8-2x=16+2x$

$+2x \quad +2x$

$8=16+4x$

$-16 \quad -16$

$\frac{-8}{4}=\frac{4x}{4}$

$-2=x$

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

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

$4-12x-18=1$

$-12x-14=1$

$+14 \quad +14$

$\frac{-12x}{-12}=\frac{15}{-12}$

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

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

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

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

$15x=10-12x$

$+12x \quad +12x$

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

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

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

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

$2m+15=12m-27$

$-2m \quad -2m$

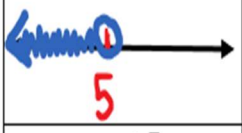
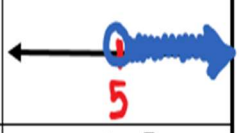
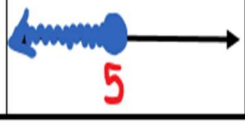
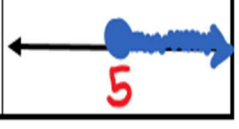
$15=10m-27$

$+27 \quad +27$

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

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

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)

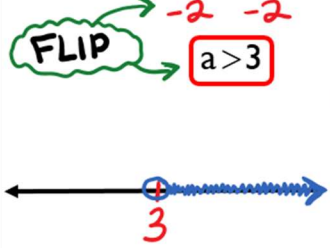
$13-2a<7$

$-13 \quad -13$

$-2a<-6$

$-2 \quad -2$

FLIP → $a>3$



REWRITE! (When variable is on the right side of the inequality)

$23\geq 7+8a$

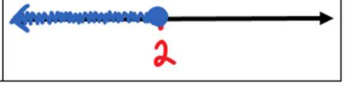
$-7 \quad -7$

$16\geq 8a$

$8 \quad 8$

$2\geq a$

REWRITE → $a\leq 2$

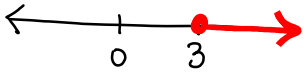


#17 – 22: Solve and graph on a number line.

17a. $x+4\geq 7$

$-4 \quad -4$

$x\geq 3$



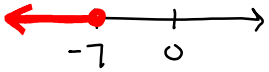
17b. $x-3<5$

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

$-5 \quad -5$

$\frac{2x}{2}\leq \frac{-14}{2}$

$x\leq -7$



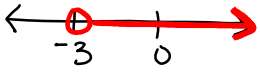
18b. $4+3x\geq 19$

19a. $3-x<6$

$-3 \quad -3$

$\frac{-x}{-1}<\frac{3}{-1}$

$x>-3$



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

20a. $5x-6<3x+18$

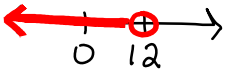
$-3x \quad -3x$

$2x-6<18$

$+6 \quad +6$

$\frac{2x}{2}<\frac{24}{2}$

$x<12$



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

COMPOUND INEQUALITIES

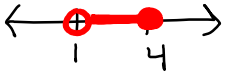
"AND"	"OR"
$-4 \le 3x-7 < 8$ $+7 \quad +7 \quad +7$ $3 \le 3x < 15$ $\frac{3}{3} \le \frac{3x}{3} < \frac{15}{3}$ $1 \le x < 5$ 	$8x-7 \le 1$ or $3x+4 > 19$ $+7 \quad +7 \qquad -4 \quad -4$ $\frac{8x}{8} \le \frac{8}{8}$ or $\frac{3x}{3} > \frac{15}{3}$ $x \le 1$ or $x > 5$
EASY WAY TO REMEMBER "AND" and "OR"	

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

$-3 \quad -3 \quad -3$

$\frac{2}{2} < \frac{2x}{2} \le \frac{8}{2}$

$1 < x \le 4$



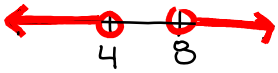
21b. $19 > 5 - 2x > -7$

22a. $4 + 2x < 12$ *or* $5 - 2x < -11$

$-4 \quad -4 \quad -5 \quad -5$

$\frac{2x}{2} < \frac{8}{2} \qquad \frac{-2x}{-2} < \frac{-16}{-2}$

$x < 4$ or $x > 8$



22b. $3 - 6x > 15$ *or* $5x - 3 \ge 12$

#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